American Foundryman

December
1941

Standards and Defense

THE importance of industrial efficiency in the present period of National Emergency is unquestioned. More than in any other time in history, the outcome of the present international situation is going to depend upon our ability to utilize, quickly and effectively, our technological and industrial strength.

Technological advancement is most rapid when knowledge gleaned from research and development is promulgated, the work of one investigator being examined critically in the light of experiences of another. The American Foundrymen's Association is one example of several technical societies which serve specifically as agents for interchange of experience of all workers in a given field.

Technical experiences can be compared only through the medium of a standardized language composed of well defined technical terms and units of measurement. The American Society for Testing Materials has long led American engineers in their search for methods of test and standards for measurement of properties of materials.

It is appropriate that collaborative effort be directed by the A.S.T.M. and A.F.A. toward providing new standards where needed to aid in development of better foundry products. An example is the cooperative program of the two societies on a standard system for classifying graphite in gray cast iron. This program resulted in a report and new tentative standard classification which were submitted to the A.S.T.M. at its annual convention in June.

The results of this work offered no new knowledge of the properties or methods of manufacture of cast iron. The new tentative standard may, however, pave the way for more efficient pooling of the work of all investigators of the physical metallurgy of this important material.

Only a single example has been cited, but it is plain that now more than ever before, technical workers and technical societies must work together for the common good.

W. E. Mahin

W. E. MAHIN, Chairman,
Committee on Classification of
Graphite in Gray Iron.

W. E. Mahin is metallurgical engineer, Feeder Engineering Dept., Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., and is chairman of the Gray Iron Division Committee on Classification of Graphite in Gray Iron. This committee did an outstanding piece of work, in cooperation with A.S.T.M. Committee A-3, Subcommittee VII, in drawing up the new A.S.T.M. Tentative Recommended Practice A 247-41T for Evaluating the Microstructure of Graphite in Gray Iron. As chairman of the A.F.A. Committee, a large portion of the credit for this accomplishment is due Mr. Mahin. In this work, he gained a first-hand knowledge of the value of A.F.A.-A.S.T.M. cooperation in the promulgation of standards affecting the castings industry. He also is a member of the Gray Iron Division Advisory Committee and of its Cast Metals Handbook Revision Committee.

American Foundryman

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Defense—Past, Present, Future

By Lt.-Col. W. C. Bliss,* St. Louis, Mo.

HITLER began preparing for this war six years before it started. During those six years of preparation he stripped the German nation for action as no nation was ever stripped before. Every single feature of German life that might in the least degree hinder the process of turning the nation into a vast arsenal was ruthlessly wiped out. Nothing was permitted to survive unless it contributed in some degree to the perfection of Nazi military strength. Every inch of slack was taken up. Every ounce of productive effort was put to work.

When the war broke out in the fall of 1939 Hitler was completely prepared. He had developed the German armaments industry to a point where he was getting the equivalent of one billion dollars worth of war production every month. He had on hand all of the guns, planes, tanks, bombs and other munitions which he immediately needed, and the productive capacity to replace those things on the necessary scale was in actual operation.

Germany Doubles Effort

The war went on and Hitler at least doubled his effort. That is, he raised German armaments production from a rate of one billion dollars a month to a rate of at least two billion dollars a month. Meanwhile, one by one, the great workshops of Europe passed under his control. France, Holland, Belgium, Norway, Poland, Czechoslovakia, Jugoslavia, Roumania, Bulgaria, Greece, Italy—all of the productive facilities in those lands are at his disposal, and he has had time to integrate them and fit them into the Nazi scheme of things.

Much of the equipment which Britain had for her land forces was lost in the battle of the low countries and the retreat from Dunkirk. Leaving the British navy out of consideration, Britain's war effort practically had to begin all over again just about 16 months ago. It had to be developed and carried on under the twin handicaps of a submarine blockade and a series of destructive air raids. It stands today, by the best estimates, somewhere between 12 and 15 billion dollars worth of war production a year. That is probably about as high as it can go.

By nerving herself for a terrific war effort and carrying it out with great bravery under the most adverse conditions, Britain finally has been able to attain a productive rate slightly higher than the rate which Germany had when the war began. Remember, too, that there is a great time handicap to overcome, that Germany has at least doubled her own productive rate, and that, in addition, Hitler now is master of nearly all of Europe. Add in, too, if you wish, the prospect that Hitler may shortly have the raw materials and factories of European Russia under his control.

Now the point of all this is that modern warfare is above all else a struggle between industrial productive systems. Barring military blunders or mismanagement on a fantastic scale—and even the most optimistic are not expecting these from the German high command — the side which maintains the larger production of war goods is going to win the war.

You can see where that leaves us.

American Attitude

Our government and the great majority of our people are committed to the proposition that Hitlerism is not going to win this war. We have declared that dictatorship shall not be permitted to control this earth and set the pattern for us and our children, and we do not here need to review the reasons for that decision. But since we have so decided—since our country has thrown its weight into this struggle and has underwritten the fight which free men are making against Hitlerism—it is as clear as daylight that our immediate and inescapable task is to make certain that the arms production of the democracies becomes greater than the arms production which Hitler can command.

You can reduce that to a very simple formula. If British war production, plus American war production, surpasses Hitler's war production then Hitler loses the war. By the same token, if the best that we can do, added to the best Britain can do, falls short of what Hitler is already getting — then Hitler wins the

Grinding castings that will play a part in national defense.

*Division of Contract Distribution, Office of Production Management.

Note: Presented before the St. Louis District Chapter, October 9, 1941.

war, he wins it completely and utterly, and the world for many years to come will live by his rules.

With that fact in mind, do a little simple arithmetic. If British production at its best cannot rise above 15 billions a year, and if German production plus production by the captive countries runs somewhere between 30 and 50 billions a year, it is perfectly obvious that America has got to produce arms on a scale not yet attempted.

How is the Defense effort coming along?

To get a good, over-all picture of our progress it is necessary that we go back to June, 1940, the time when the program really got underway; when we were in the blueprint stage. Then it was necessary for us to lay our plans. We had to find out just what was needed—how much was needed—and how to go about getting it. Early in the program we tried to figure out the exact quantities of everything the Army and Navy required. We realize now that this was a mistake. Except for a few definite things like uniforms and shoes we know that we need as much as we can get of everything.

Four Big Problems

The four big problems were plants, machines, raw materials and men. Some plants were fully equipped to do their particular job. But these factories could only be used as a foundation. They just did not have the capacity to turn out enough for such a huge program. So, two things had to be done—first, to find plants that could be changed over from their normal work to producing new goods for Defense—and second, to build new plants. It was a tough job to get raw materials but it was done. All over America stockpiles of vital materials were collected—materials from our own country and from the four corners of the earth. Men, too, were obtained. During the blueprint stage the best way to get the right men for the right jobs was carefully planned.

Then came the tooling-up stage. We had to get the tools that are the backbone of modern efficient production—the tools that make other tools—that make bombers and battleships. We are getting physically ready for production.

Today we are on the move!

Results of Defense Program

In July, 1940, 561 planes rolled off the assembly lines. This June, 1941, 1,476 military planes were built! Last January we turned out airplane engines with a total of 2,310,000 horsepower. In June, 1941, the figure was increased to 3,640,000 horsepower.

Right now we are building over 350 major combat ships—ranging in size from submarines to cruisers to battleships. The Carolina, mightiest warship in the world, was commissioned in April.

Guns are essential to defense. In June, 1941, we were producing rifles and sub-machine guns at the rate of more than 1,500 a day. In August, 1940, it was only 289, and in January, 1941, it was 931.

Guns must have powder and bullets. About 20 huge plants all over America are being built—plants for turning out powder and bullets almost faster than we can make guns. Some are already completed.

Tanks are being produced at the rate of more than 200 a month. Production of light tanks the second quarter of this year was 1,260 per cent greater than in the first quarter. Medium tank production was up 237 per cent.

Priorities, Procurement, Production

Let me give you an idea of the magnitude of this Defense business. From an Army point of view, we are procuring the critical and essential items for a balanced force of 2,000,000 men, and the critical items only for 800,000 more. From the Navy point of view—for lack of a better definition—the best two-ocean Navy in the world. From the outside point of view—to be the arsenal for all democracies. That is a whale of a job.

To do this ever-increasing work, this job has been divided into three parts: Priorities, Procurements and Production.

Priorities Division: Authority for the operation of the Priorities system for Defense purposes has been delegated through OPM to this Division. Here is how it works: First, the Army and Navy Munitions Board decides upon the type of military machine that should be built—in this case aircraft first, naval vessels second, etc. These Priorities are passed on to the OPM Priority Division.

When shortage of materials exists, mandatory nationwide control is imposed. It is now in effect on iron, steel, aluminum and many other metals. When partial or probable shortages occur, several systems of preference ratings are used. Bernard Baruch has said that the man who controls Priorities controls the national economic life of a country.

Procurement Division: The Procurement Division corresponds exactly to the purchasing department of any ordinary business. This one will probably handle over 50 billions of dollars of business.

Production Division: In production we have, first, an Industrial Materials Division, an extremely important function, and like priorities it comes into existence only during war preparations. This group is responsible for the sources and supplies of all raw and some semi-finished materials for both military and commercial use. They figure and try to balance the demands for all materials required. They encourage substitution. The other sections in Production are: (1) machine tools, (2) aircraft, (3) ships and general construction, and (4) ordnance.

Machine Tool Section: Machine tools have the highest Priority rating of all. Without machine tools there would be no wars of the present type. In the old days Paul Revere would unhitch Dobbin from the plow, clap on a saddle and ride through the night. Pappy would take down his grandpappy's old smooth bore, and with a pocket full of lead slugs, greased patches and a powder horn, your

Setting cores in an automotive foundry.

army was ready and the war was on. Today it takes six to nine months to equip our military-goods factories with machine tools; but when these plants are so equipped, the output of weapons for the annihilation of persons and things is of staggering volume.

Aircraft Section: Production schedules on our present military plane program are being met. New engine plants and new assembly plants continue to be built. It took the automobile industry 25 years to reach an annual volume of 3½ billion dollars. In about two years we are building an aircraft business of over 5 billion dollars.

Ships and General Construction: Here is a high spot report. A two-ocean Navy in four years would double the number of, and triple the tonnage of major ships —generally ahead of schedule. The 200 merchant vessels now being built represent a 50 per cent increase—on schedule. The new lend-lease program would double the present merchant marine. Other projects and construction include: 200 cantonment projects—virtually complete; 100 Army airfields, including overseas bases, projects ahead of schedule—nearly completed; 100 Navy construction projects, air bases; and Navy yards and other projects well ahead of schedule, nearing completion.

Ordnance Section: The first section of the OPM Ordnance is small arms and "ammunition therefore." Small arms include revolvers, rifles, sub-machine guns, .30 and .50 caliber machine guns, .20 and .37 mm guns. "Ammunition therefore" probably does not register at all. You may start to take a little notice when I tell you that we are getting geared to produce 20,000,000 of the .30 caliber trinkets every 24 hours and 4,000,000 of the .50 caliber cartridges or one million rounds every hour, about 50 per cent more than in 1918.

If you could fire a .50 caliber gun for one hour, and of course you cannot because the barrel would burn up; but if you could, the cost for ammunition per hour would be $5,015, or the productive labor at $1 per hour of 5,000 men. You know some companies which employ about 5,000 men. Think of one and then remember that its entire force has just enough productive labor to keep one .50 caliber gun going if fired steadily.

The next unit in OPM Ordnance is heavy ordnance. This starts with .40 mm Bofors guns and goes through the full range and finishes with the 16-inch cannons. It also includes bombs, shells, torpedoes and optical instruments, fire control apparatus and radios. Also in this Heavy Ordnance Unit are the time fuses. The internal mechanism is quite comparable to that of a high grade watch. We are being asked to produce 800,000 of these per month. That is just like shooting to bits 800,000 nice, expensive watches. It is not generally realized that in connection with many guns the fire control instruments may have more machine hours and cost more than the gun itself.

The third section is powder, explosives and anhydrous ammonia, toluol, bag loading and shell loading. This, in spite of the names, is rather a quiet section. There are about 24 plants costing about $500,000,000 employing some 20,000 men in the manufacturing processes. This will be greatly increased. But here is an interesting figure. It will take 37,000 men to load into silk bags and shells what these 20,000 men produce. Powder plants are big affairs but in the hands of skilled people come into production daily.

The last unit is tanks and combat cars. Tanks in the eyes of the public might be called glamour girl Number Two, aircraft being Number One. The public expects the spectacular. A giant bomber or a 25-ton tank is a spectacular thing. Some of you may have seen this tank at the Chrysler Arsenal. I do not know how to describe that monster—25 tons doing 25 miles per hour; a 450 HP aircraft engine; armor plate; top, sides and bottom. Some of it is two inches thick. The transmission alone weighs as much as two five-passenger cars. It has a revolving turret like a battleship —equipped with one .75 mm and one .37 mm cannon, and a cluster of .30 caliber machine guns. Seven men are inside — all shooting.

Defense Machine Rolling

The Defense machine is beginning to roll — but it is only well started. But each day it gains in momentum. You will hear criticism. Some of it undoubtedly is deserved. But keep in mind the magnitude of the task. Assume you are comfortably jogging along, running a business grossing a million dollars a year. In about 15 months you are grossing $250,000,000. I ask you, will all departments of your business be functioning smoothly?

So much for the nation as a whole. What about the Defense Contract Service and the Division of Contract Distribution?

Defense Contract Service

Early last spring the Defense Contract Service was established with the prime idea of promoting sub-contracting. Through the efforts of this organization, it was hoped that large prime contractors could be persuaded to farm out portions of Defense work to smaller concerns, thereby distributing the load, and speeding up the progress. Under the direction of the Office of Production Management, offices were set up in the 12 banks and 24 branch banks of the Federal Reserve System. Each office, so formed, is headed by a Coordinator, selected from the ranks of prominent local industrialists, and compensated at the rate of $1.00 per year. The remaining personnel consists of a district manager, the requisite number of engineers, statisticians, clerks and typists. In some of the larger cities the Army and Navy also assigned special Liaison Officers to this work. Volunteers, working without compensation, also are being used in some instances.

St. Louis is the headquarters of the Eighth Federal Reserve District, with branch banks in Little Rock, Memphis and Louisville. The first thing needed was a list of all plants in this district capable of engaging in Defense work. This was secured by sending out questionnaires through chambers of commerce and other similar organizations. Up to date we have accumulated data on over 2,500 such plants in the St. Louis area. Facility cards have been prepared on each plant. These cards are filed alphabetically by states and cities in a visible record where they are available at all times for ready reference.

Invitations to bid are received daily at our office from the various procurement agencies of the Army and Navy. There is a wide assortment of items such as food, wearing apparel, drugs, machinery, equipment, arms and ammunition. Naturally, the last two predominate.

Obviously, with the daily receipt of numerous inquiries, including specifications and drawings, some system is needed. First of all, to see that all plants with proper facilities are contacted, and, secondly, to see that all information pertaining to each invitation is segregated and made quickly available for inspection. A system has been developed which is entirely satisfactory, and which provides a record of what transpires on each inquiry. For instance, every morning the items on each inquiry are typed on a galley sheet. There is a separate galley sheet for each procurement agency. These galley sheets are placed side by side on a long shelf where they are available for inspection by those seeking Defense work. Inquiries on machinery, equipment, arms and ammunition are usually accompanied by specifications and drawings. These immediately are attached to a project sheet on which is noted the plants to be contacted as determined by consulting the facility cards. After closing date on bids, these project sheets are filed numerically, thus providing a record of each inquiry.

Weekly Bulletins

Every week a bulletin is sent out to a selected list of about 2,800 plants, showing items needed by the various agencies. Plants located nearby can visit our office to inspect these items, but those not having this advantage must write or wire the particular agency for specifications and drawings. Such information is available through bulletins we issue.

Progress Made

Last May when we started functioning, it was difficult to arouse interest. Many plants said they were too busy with normal products but would submit figures if we insisted. A month later the Priorities Division began restricting the use of raw materials; as a result these same plants were then more than anxious to engage in the Defense Program. From June, 1940, to October, 1941, the Metropolitan St. Louis area has enjoyed a substantial Defense business. Aside from the dollar value of prime contracts awarded, the chief interest centers in how many plants have taken part in prime and sub-contracts. As of October 1, 1941, there have been 130 firms engaged in prime contracts, and 146 firms engaged in sub-contracts. Our organization has assisted 124 prime and sub-contractors during this period. In fact, the dollar value of "assists" by our organization during September amounted to $3,885,675, covering 11 prime and 111 sub-contracts. The latter awards were largely under $50,000 each. The total awards on prime and sub-contracting for September amounts to $12,730,131, exclusive of food, wearing apparel, medical supplies, building and construction. The indications are that from now on the awards in this area will show a steady increase. This assumption is based on Eastern plants being

Pouring metal means an endless stream of necessary national defense tools.

operated to capacity; also to the display of more initiative and more aggressiveness on the part of our manufacturers.

Priorities vs. Employment

On September 4th President Roosevelt, by Executive order, created the Division of Contract Distribution to supplant the Defense Contract Service. Floyd B. Odlum, an industrialist of national prominence, was made Director, and to a large extent the existing personnel was retained. The powers and scope of activities of the new organization has been enlarged. Activities will be confined largely within state boundaries, which means the creation of many new offices in strategic locations. By cooperation with Federal and State Employment Bureaus, distressed plants will be given every consideration to prevent shutdowns, or layoffs. First of all, a determined effort will be made to secure Defense work of a type suited to plant facilities, and possibly on a negotiated basis. If this is not possible, then a recommendation may be made to the Priorities Division in Washington to allocate sufficient raw materials for the manufacture of normal products to prevent unemployment. No set rule can be established. Each case must be treated separately, and decided on its merits.

Mr. Odlum has publicly stated that every effort will be made to prevent unemployment occasioned by the Defense Program. It is up to us, and the Missouri Employment Service, to advise him and to make recommendations. The latter may cover special defense items most suitable to distressed facilities, or, if this is not possible, it may mean allocating a minimum amount of raw materials to the manufacture of regular civilian products. Bear in mind that while this Defense Program must succeed, your Government does not want to cause unemployment through Priority restrictions. Everything possible will be done to help distressed plants. There is an old adage that says, "The Lord helps those who help themselves." Be that as it may, there are certain plants nearing the distressed state, who have not made a sincere effort to obtain Defense work. They call at our office and look over items we know they can make, yet refuse to bid because only a portion of their equipment will be engaged. While it is ideal to secure awards which will utilize the maximum number of man hours on all machine tools, such conditions are difficult to obtain.

The Defense Program cannot await on dilatory tactics. We must all do our part regardless of the sacrifice. Why worry about profits when taxes will absorb a large portion. Patriotism is what counts in this Emergency! Surely, our Country and our democratic form of life is worth the effort. Many of us here in the Middle West fail to realize the seriousness of this situation. Those living on the Atlantic and Pacific seaboard feel differently. Let me state most emphatically that we must all put our shoulders to the wheel and see this program through to a successful conclusion.

What can you do? Well, you and other Service Organizations can urge plant owners to call at our office in the Federal Reserve Bank Building and seek our aid. In cooperation with the Missouri Employment Service, we will find some way to be of assistance. Every impediment to production, whether it be idle tools, or idle men, is an aid to the aggressor. Whether or not our American way of living is to survive amidst this world of turmoil, depends on you and me, and whether we are willing to do our part.

Steering Committee to Direct Cupola Research

THE major project of the Gray Iron Division, that of Cupola Research, this past year has been under the direction of a general committee with some seven subcommittees covering (1) cupola equipment, (2) ferrous materials and alloys, (3) operation and process, (4) slags, fluxes and desulphurizers, (5) refractories, (6) fuels and combustion, and (7) finance. With over 80 members serving on the general and subcommittees, at a meeting of the general committee held recently in Philadelphia, the appointment of a small committee, the members of which could meet frequently was authorized to direct the work of this project.

This steering committee, which has since been appointed, is under the chairmanship of D. J. Reese, International Nickel Co., New York City. Serving with him are:

Max Kuniansky, Lynchburg Foundry Co., Lynchburg, Va.

S. C. Massari, Association of Manufacturers of Chilled Car Wheels, Chicago.

R. G. McElwee, Vanadium Corp. of America, 2440 Book Bldg., Detroit, Mich.

John Lowe, Battelle Memorial Institute, Columbus, O.

The steering committee held its first meeting at St. Louis on November 14. Progress reports were reviewed which indicated that several sections of the cupola operation manual, the first project of the committee, would be available for review at the Cleveland convention next April.

The digest of the published literature on cupola operation, being made at Battelle Memorial Institute, Columbus, O., by Schuyler Herres is well along, some 430 articles having been abstracted and copies sent to the committee up to November 14.

A drive for funds to carry out the project research work is being undertaken in the various foundry centers by the cupola research finance committee. Small local committees are canvassing the foundries of their districts for contributions and a good start is being made on raising the funds needed.

A publication list has been compiled by the American Foundrymen's Association revealing the numerous books, pamphlets and preprints that are available. Write in for your copy of this list today.

An author tells us that consistent differences in hardenability of cast irons arise from variations in deoxidation and melting practice.

Describes Causes and Remedies for Blows in Gray Iron Castings

By W. A. Hambley,* Milwaukee, Wis.

This article is the first of a series being presented by members of the Gray Iron Division Committee on Analysis of Casting Defects. It is quite fitting that the first such article should be presented by the author, since he is chairman of the committee. This so-called "Defects Committee" is one of the most active in your Association. The November issue of American Foundryman carries a resume of defects to be discussed by the committee.

IN the November issue of *American Foundryman*, on page 16, the first article on the work of the Committee on Casting Defects was published. This article outlined the purpose of the committee and gave a list of defects which has been set up as a starting point but is not necessarily the final word, as we have found during our studies that changes often must be made. It is the hope of the committee that, with this list as a starting point, foundrymen will write to the secretary with ideas of their own on what a defect should be called, so that when the final list is considered complete, it will represent the majority opinion.

In studying defects, the first step was to define what it looks like. These definitions are made as simple as possible and yet comprehensive enough to enable one to identify the defect. After a decision on the definition has been reached, the second step is to list the causes by the various operating headings as outlined in the November issue of *American Foundryman*. The next step is to list possible cures, especially where the cure may not be obvious from the cause.

Discusses First Defect Listed

The first defect on the list is Blows. When studying this defect, it was felt that gas holes, pin holes and blisters also should be included in this heading. As gas is the contributing factor to all these defects, the different names only indicated different stages or degrees of progress. Consequently, both the causes and the cures are the same for each. Below is the definition and causes of blows as so far accepted by the committee.

No. 1. Blows, Gas Holes, Pin Holes, Blisters

Definitions:

Blows or Gas Holes — Usually are rounded cavities, either spherical, flattened, or elongated, and are caused by the generation and accumulation of gas which does not escape either through the sand or the metal. They may vary in size from a minute cavity of a few thousandths inches and up. The walls may vary from dark blue to a silvery metallic luster. True blowholes caused by trapped bubbles of gas in the metal rarely occur on the drag surfaces of a casting. They may occur as a smooth depression on the outside surfaces of the sides or cope, or as a series of jagged, irregular depressions on the cope, especially on flat spots. Porosity, slush or dirt caused by steam or gas passing through the metal with the resulting disturbances and the consequent combination of dirt or dross (mold slag), or shrink or dendritic area is a form of a blow. Core blows generally show on the inner surface of a cored cavity or in the wall above a cored cavity. Blows caused by chills, chaplets, or wires are found as one or more gas pockets adjacent to these inserts.

Pin Holes—A portion of the casting, or sometimes the entire surface of the casting is pitted with small holes about the size of a pin point.

Blisters—A shallow blow appearing on the surface of the casting with a thin film of iron over it.

Causes:

A. *Due to Design.*
   1. Lack of proper support for core.

B. *Due to Pattern, Flask Equipment and Rigging.*
   1. Bars in flask too close to mold surface.

C. *Due to Sand.*
   1. Too high moisture (Fig. 1).
   2. Too low permeability.
      a. Too high fines.
      b. Too low grain fineness and/poor grain distribution.
   3. Too high green strength.
   4. Too high lime content.
   5. Too much carbonaceous or gas producing material.

Fig. 1—Casting Defect Due to Too High Moisture (Wet Sand).

*Metallurgist, Allis-Chalmers Mfg. Co., and Chairman, Gray Iron Division Committee on Analysis of Casting Defects.

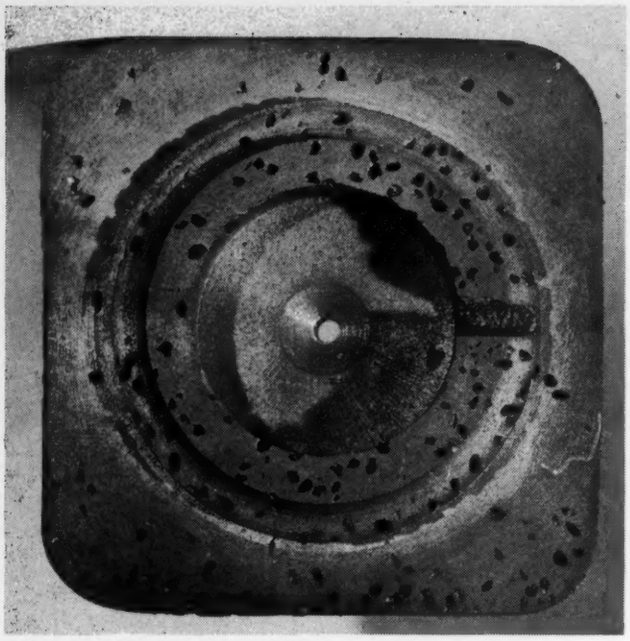


Fig. 2—Casting Defect Caused by Boiling Ladle. This Defect Has Been Duplicated in Tests a Number of Times.

6. Foreign material inclusions such as shot iron, nails, coke, etc.
7. Concentrated clay balls.

D. *Due to Cores.*

1. Hard cores or hard spots in the core.
2. Low permeability in core.
3. Cores improperly baked.
4. Improper venting in the cores.
   a. Vents too near the surface.
   b. Insufficient amount, too small, or too large.
   c. Not properly protected.
   d. Permeability of core too high in comparison with the amount of vents.
   e. Vents closed off in pasting cores.
5. Core paste causing the iron to boil; too much or too wet paste.
6. Iron getting into the vents.
7. Improperly sprayed, dipped or coated.
8. Too much carbonaceous or gas producing material.
9. Cores absorbing moisture, either in storage or in mold.
10. Hook or hanger holes improperly filled.
11. Joint sealing material improperly applied.
12. Exposed core wire.

E. *Due to Molding Practice, Gating and Risering.*

1. Any combination of hot and cold materials.
   a. Hot flasks and cold sand.
   b. Hot sand and cold flasks.
   c. Hot sand and cold core.
   d. Hot core and cold sand.
2. Improper venting.
   a. Either green or dry sand mold.
   b. Vent from core to outside smaller than vent in core.
3. Improperly dried molds.
4. Hard ramming causing mold hardness to be too high and permeability too low.
5. Ununiform ram and ramming too close to pattern.
6. Gaggers or soldiers too close to the pattern.
7. Excessive slicking and patching.
8. Wet clay at parting line.
9. Too low head pressure due to improperly designed gates and runner boxes.

F. *Due to Iron Composition*—None.

G. *Due to Cupola Operation.*

1. Cold melted or sluggish iron.
2. Oxidized or gassy iron caused by:
   a. Too low a bed.
   b. Wet and hard rammed bottom.
   c. Improper slag blanket.
   d. Excess air causing loss of fluidity or gassy iron caused by improper balance in the cupola.

H. *Due to Pouring.*

1. Sloppy pouring, not keeping the runner boxes filled thus allowing air to be sucked down.
2. Cold and damp ladles. (Fig. 2.)

I. *Miscellaneous.*

1. Due to Chills, Chaplets and Wires.
   a. Chill too cold.
   b. Rusty chills, chaplets or wires.
   c. Improperly coated chills, chaplets or wires.
   d. Damp chills, chaplets or wires.
   e. Pitted or checked chills, retaining moisture.

This gives some idea of the way the causes and remedies of a defect are analyzed. In the March Issue of *American Foundryman,* on page 9, is an article by one of the committee members. In this article A. S. Klopf has shown the effect of gas caused by a boiling ladle, as well as by wet sand. Mr. Klopf was able to create this type of blow at anytime he desired by simulating the conditions necessary. This same type of blow has been caused by cores under D-9, E-1-c, and E-1-d in jobs requiring cores. In most cases, it is nearly impossible to ascribe a blow to one single cause. More frequently, it is the combination of one or more causes.

Explanation Based on Facts

Much has been written by numerous authors on this subject of blows, pin holes, etc., and there probably remains much more to be written. However, the committee feels that by intelligently interpreting the causes, one can get to the bottom of the trouble. Many times a defect is cured by changing the source of supply of some material and blaming this material for the defect, when in reality the material had nothing to do with it.

We are all prone to alibi and try to evade the issue, especially when scrap castings is the subject. It is also true that no one deliberately tries to increase the scrap pile. Consequently, we feel that when everyone concerned gets down to facts and honestly analyses the defect, without hard feelings as to who caused it or trying to pin it on some individual, the quicker the defect will be permanently cured.

We have seen this procedure worked out in one large foundry with the amazing results which cut the scrap pile in half. Honest analyses of the scrap, with a little praise for individuals working it out, did it. Next month we hope to continue this discussion of defects with a write up on Ram Off or Ram Away with pictures of the defect. This is to be done by W. C. Wine, general superintendent, Sibley Machine & Foundry Corp., South Bend, Ind., a member of the committee.

Interest in 1942 Convention and Show Mounts Steadily

INTEREST in the 1942 convention of your Association is mounting steadily as indicated by the gradual development of an excellent technical program and the excellent response of exhibitors to the invitations to display their products and services at the Foundry and Allied Industries Show to be held at the Public Auditorium, Cleveland, Ohio.

Annual Foundrymen's Week will be held earlier this year, April 20-24, inclusive, with annual Preview Day on Saturday, April 18. The Northeastern Ohio Chapter, the host to the 1942 convention, is already busy making plans for local cooperation. Chairmen of various committees, which will assist in staging convention events, have been appointed and, on December 8, will meet with chapter officers and directors and National Association officers to make plans for their activities.

Technical Program

Commitments for papers, secured by various Association program and papers committees, already in at Association headquarters presages one of the most interesting and informative groups of sessions ever held by the Association. Because of the problems confronting the industry and its participation in the National Defense program, much of the information will be valuable to foundrymen throughout the continent in seeking to meet the every-day demands of high quality with much expanded production. The program will feature the solution of both practical and research problems. Included in the program will be sessions of special interest to management. A number of general interest sessions also are scheduled.

As at present constituted, the program calls for practical shop operation courses from 9 to 10:00 A.M. each convention day with the exception of Monday. On that day, registration will be from 9 to 12:00 A.M. Non-ferrous and malleable sessions are scheduled for Monday and Tuesday with the evenings of these two days devoted to sessions of general interest. Both the non-ferrous and malleable division round table conferences are scheduled for Tuesday noon. Two sessions of the patternmaking division are being scheduled this year, one on Monday evening and the other on Tuesday afternoon. Management sessions are scheduled for Tuesday morning, afternoon and evening. The morning session will discuss apprenticeship, the afternoon, foreman training, and the evening, safety and hygiene.

General Interest Meetings

On Tuesday evening, the annual dinner sponsored by the A.F.A. Apprentice Training Committee will be held. On the same evening, the Non-Ferrous Division will revive its popular division dinner.

The annual business meeting and awards lecture will be held Wednesday morning with the remainder of the day plus Thursday and Friday being devoted to gray iron, steel and general interest sessions. On these days, such sessions of general interest as those devoted to plant equipment and maintenance, job evaluation and time study, foundry instruction, merchandising castings, foundry sand research and foundry costs will be held. The steel division round table luncheon will be held Thursday noon and the annual dinner Thursday evening.

Each day of the convention, from 4:30 to 5:30 P.M., the annual lecture course devoted to "Core Practices and Theories," the continuation of the series of sessions held during the 1941 convention, will be presented by Harry W. Dietert, Harry W. Dietert Co., Detroit. The material used in these lectures will be expanded and published in book form and will first be made available during the convention.

As has been the case in the past several years, a chapter delegate meeting is scheduled for Wednesday afternoon with the chapter officers' dinner on Wednesday evening.

Exhibit News

Applications for space thus far received indicate that the 1942 Foundry and Allied Industries Show will be the largest of any held in recent years. Response to formal announcement of the 1942 Show is positively the most promising ever experienced. Space applications on

Cleveland's famed Terminal buildings development that members will be able to see when entering the convention city.

file are fully 65 per cent greater than for a similar period for any previous year. Surprising as it may seem, practically all companies requesting space have asked for as much and, in many instances, more than they used at the 1940 Show. Members will also be interested to know that a number of companies have requested space which either have never exhibited before or are returning to exhibit their products after several years' absence. Layout plans for the exhibit are in the process of completion and soon will be sent to all applicants of record so that they may designate their choices of location.

The exhibit management has been cooperating with government agencies in their plans to exhibit at the 1942 Foundry Show and with the ordnance officer-in-charge, Cleveland Ordnance District and the Cleveland Post, Army Ordnance Association, in connection with the exhibit of ordnance equipment. Progress thus far in these two fields indicates that the National Defense exhibit will be an outstanding success. As an aid to foundrymen not yet participating in the National Defense effort, a display of castings will be shown in connection with the ordnance exhibit so that foundrymen may see the type of castings which are required and determine which of the various types might be produced in their respective plants.

A.F.A. Committees Hold Several Meetings at Philadelphia

TAKING advantage of the fact that members of many A.F.A. committees were in attendance at the National Metals Show in Philadelphia the week of October 20, several committees held meetings to discuss their activities. The meetings were held on Wednesday and Thursday, October 22 and 23, at the Benjamin Franklin Hotel.

Wednesday morning the Cupola Research Subcommittee on Scrap met to discuss the progress that was being made in compiling the information for its contribution to the work of the Cupola Research Committee. At noon of the same day a luncheon and meeting of the General Committee of the Cupola Research Committee was held. At this meeting chairmen of the various committees and subcommittees reported on the progress that was being made.

Pictures taken at various A.F.A. committee meetings which met in Philadelphia during the recent A.S.M. Convention.
(Photos courtesy Bradley Booth, Jackson Iron & Steel Co., Jackson, O.)

Of particular interest was the report that, at Battelle Memorial Institute, which is cooperating with the committee in making a search of the literature dealing with cupola practice, over 600 articles thus far have been abstracted and that these abstracts were, or soon would be, in the hands of the committee members.

On Wednesday evening, a meeting of the Steel Division Advisory Committee was held at which plans for the year's activities were discussed. Of particular interest was a motion to the effect that the various committees should be charged with the responsibility of securing papers on worth while and interesting subjects for the annual convention program and that the Program and Papers Committee serve as an editorial and acceptance committee.

On Thursday morning, there was a meeting of the Gray Iron Division Handbook Revision Committee. Various members of the committee, to whom sections had been assigned, reported and the results were very gratifying. At noon there was a meeting of the Technical Activities Correlation Committee composed of members of the Board of Directors. This committee met and acted as host to division chairmen and chairmen of general committees. An extremely interesting meeting was held at which the widely diversified activities of the Association were evident. In the afternoon, a meeting of the Program and Papers Committee of the Non-Ferrous Division was held and reports indicate that a very interesting program is in store for non-ferrous foundrymen at the 1942 convention.

The Subcommittee on Heat Treatment, Gray Iron Division Alloy Cast Irons Committee, also held a meeting on Thursday and reviewed assignments that had been made to committee members and the progress made.

Attendance at all committee meetings was exceptionally good and considerable was accomplished for the benefit of the foundry industry and the Association.

Hello! What Have We Here?

BEGINNING with this issue, and henceforth, we will bring to you each month in American Foundryman, comments of the A.F.A. National Office Staff on some up-to-the-minute questions and problems and let the chips fall where they may. If you don't agree with us, tell us about it; if you do, tell us about it too.

A.F.A. is a cooperative organization and you are one of the cooperators. Speak up! Let's hear what you have to say.

Cooperation—A Parallel

While we are talking about cooperation, the other day we received an interesting letter from Vincent Delport, our European representative, whose offices are in London. Vincent reports that things have been rather quiet during the summer months. "They" chased him out of London some time ago by delivering an "egg" during one of the "hot times" and damaging his offices but fortunately hurt none of his staff. Vincent is now back in London again and "doing very well, thank you."

But to get back to cooperation. In his letter, Vincent enclosed a squib announcing the formation of the Council of Ironfoundry Associations. The British, like we here in America, are great believers in associations and cooperation—and well they should be. They realize, as do we here, that no one man knows everything and that no one company has an option on all the brains in the industry. They know that associations provide a medium to pool industry's knowledge for the benefit of its product. Take the foundry industry, for example; you know and I know that the steady progress of the foundry industry would not have been possible if there had been no mediums to pool and disseminate the industry's information in its many fields.

In the foundry industry, we here in America seemed to realize the above fact sooner than the English and formed A.F.A. in 1896. The British soon followed, however, and in 1904 founded the Institute of British Foundrymen.

Nor does the parallel stop here. Following the formation of these two organizations and a realization of the good they could do for the respective industries, it was natural that other associations and societies should be formed to function in fields in which these technical associations could not. In England, it was the National Ironfounding Employers' Federation for heavy castings, the British Ironfounders' Association for light castings, the National Malleable Ironfounders' Association for malleable castings, the Ironfounders' National Confederation, and others. In America, it was the Steel Founders' Society of America, the Gray Iron Founders' Society, the Malleable Founders' Society, National Founders' Association, Association of Manufacturers of Chilled Car Wheels, Cast Iron Pipe Association and others whose functions were either managerial or technical.

The result appears to be much the same in both England and America and Vincent puts it very well in his squib:

> "Until recently, these various associations dealt with the particular interest of their own members, without much intercourse with one another. As a result, there was no organization which properly represented the interests of the industry of iron castings as a whole. This created a difficult situation when questions concerning the industry, irrespective of its sectional interests, had to be taken up in connection with war production. The position was all the more unfavorable as the Ironfoundry industry came under the Iron and Steel Control for all matters concerning supplies of most raw materials, allocation of contracts, competitive production against fabricated steel, etc. In fact, there was no organized body that could speak for the industry as a whole. This was unsatisfactory both for the industry and for the government departments that could not properly discuss the same problems of general interests with representatives of a comparatively large variety of separate organizations.
>
> "This defect has now been remedied by the formation of the Council of Ironfoundry Associations, which comprises the great majority of existing associations responsible for the bulk of the national output of iron castings, with a view to representing the industry in negotiations with the government and other constituted bodies. It will also play its part in the solving of post-war problems both nationally and internationally. Sectional interests will continue to be covered by the individual associations."

That, no doubt, sounds familiar to many of you. But don't you think the British have fallen a little short of the mark? Their Council includes only the "ironfounders." Wouldn't it be better to have an over-all committee composed of all branches of the foundry industry, iron, steel, malleable and non-ferrous?

Apprentice Training in Production

By J. A. Bowers,* Birmingham, Ala.

This article describes the apprentice training course at the American Cast Iron Pipe Co., Birmingham, Ala. The course is so designed that its graduates will be able to step into any supervisory job in a production shop because they will have the proper technical and fundamental knowledge of the production of castings. The training requirements are divided into four sections, dealing with the casting aspect, physical and chemical laboratory techniques, inspection and core work. Each of these classifications, and the courses presented relating to them, are discussed in detail. The total length of time spent by the apprentice is 10,000 hours or a total of four years. This is the first of a series of articles on apprentice training by members of the A.F.A. Apprentice Training Committee.

APPRENTICE training was started at the American Cast Iron Pipe Co., Birmingham, Ala., in 1912. The original program lasted until 1927 and consisted of shop training only. If the apprentice obtained technical training of any kind, it was entirely through his own initiative. The foremen encouraged their apprentices to attend night school, but no coercive measures of any kind were used. During the past 5 or 6 years of this period, a special class in blueprint reading was organized, but the apprentice was not obliged to attend the class to get his periodic increase in wages.

The program that is now in effect at the company was started in 1927. This program has consisted of training in the regular or standard trades to make journeymen machinists, machinist tool makers, pattern makers (both wood and metal), molders, electricians, carpenters, etc., with correlated study of the technical phase obtained from International Correspondence Schools' courses. This procedure has afforded an excellent opportunity of developing well qualified journeymen in these different trades.

Hours of Training Required

A complete and thorough explanation of this apprentice training plan was written by S. D. Moxley, assistant to the vice president, American Cast Iron Pipe Co., and was published in the magazine *"Southern Power and Industry,"* March, 1940. However, a brief resume of the plan may be worthwhile. The apprentice contract requires 10,000 hours of which 1,000 hours consists of class room work. A 1,000-hour probationary period, beginning at the time of employment, is provided so that the shop foreman and the apprentice supervisor may have an opportunity to study the aptitudes of the apprentice for the selected trade before he signs a contract.

After the apprentice has signed the contract, the shop and class room work are carried on concurrently and the apprentice is paid for the time spent in both places. Satisfactory progress must be made in both the shop and the class room for the apprentice to receive his increase in rate of pay at the end of each 1,000-hour period. The starting rate for all apprentices is 46 per cent of the journeyman's rate and the increase in rate is such that during the last 1,000-hour period, before the completion of the contract, the apprentice is earning 80 per cent of the journeyman's rate.

Apprentices Receive Bonus

When the apprentice has completed his training, the entire cost of the International Correspondence School's course is refunded him in addition to a $100 bonus awarded him by the company. He also receives a diploma from the International Correspondence School, as well as his company contract, which certifies that he has successfully fulfilled all of its requirements and is signed by the department foreman, the apprentice supervisor, the chairman of the Board of Operatives, and the chairman of the Board of Management.

Production Departments Trained

The above plan has worked so successfully for our plant in the regular trades that we felt the need of a similar training for our production shops. In the past, the supervisors in the production shop have been supplied from outstanding workmen who may or may not have had technical training in the particular job and who had to prepare themselves for it in a comparatively short time. In numerous instances, the prospective supervisor had had no training or instruction in necessary operations supporting the one he was chosen to supervise, which was, to some extent, a handicap.

Related Subjects Taught.

The object at the inception of this apprentice plan was to develop supervisors who had been trained practically and technically in all the different operations in the production shop. Accordingly, we formulated a tentative plan of shop work and related technical subjects that were submitted to the International Correspondence School and, with a few minor changes, they gave us their whole-hearted support by adopting the study plan as a standard apprentice course. This plan will be discussed more fully in the following paragraphs.

Production Apprentice Course Calls for Four Periods

In developing the production apprentice course, the work in the shop was divided into four periods, and courses of study were selected and arranged so that the subjects would be related to the training in the shop at each station. The total

*Melting Superintendent and Apprentice Supervisor, American Cast Iron Pipe Company, and member, A.F.A. Apprentice Training Committee.

Fig. 1—Apprentice taking temperature reading while working in the melting department.

time of the training period of each station was arranged to give the apprentice a fair working knowledge of each operation involved. The total length of time of the apprentice contract is 10,000 hours.

Casting (I)

The first station of training is the casting operation. In this station, the apprentice is taught the proper operation of the casting machines by actually operating them for 4 months. Through this training, he learns the many causes for casting loss caused by inattention or carelessness of the casting machine operators.

Control of Casting Weights

He then is moved to the station for the control of casting weights where he spends 4 months making size and weight changes and assisting the casting machine foreman in the production of pipe. During this time, he learns the correct manipulation of the machinery for synchronizing pouring speed, machine speed and metal temperatures for the different sizes and classes of castings.

Melting

Then he is sent to the melting department where he is given a practical working knowledge of cupola operation, particularly with reference to its relation to the production shop (Fig. 1).

Related Instruction

In this first year in the apprentice class, the apprentice is given a basic knowledge of the following related subjects: mathematics, elementary chemistry, metallurgy of iron, metallurgy of steel, foundry chemistry, cupola practice, mixing cast iron, foundry sand and refractories. The apprentice, in completing this first year of training, has received basic knowledge, both practical and technical, in the actual operation of casting pipe.

Physical and Chemical Laboratories (II)

At the end of the first year of training, the apprentice is transferred to the physical and chemical laboratories where he spends 3 months running routine chemical analysis on the iron for the castings or from the test bars that are cast at periodic intervals during the day to determine the physical strength of the metal.

Sand Control

Three months are spent in the production shop, learning the methods used for controlling the sand, blacking or facing, and the clay used in preparing the molds. Here he conducts bond, permeability, and moisture tests on the sand and determines the specific gravity of the clay and facing material.

Ramming

He is then sent to the ramming station to act as a sub-foreman and learn the operation of ramming the molds. In this station, he learns the many causes and the remedies for casting loss due to improper ramming, facing or drying the molds. Front cover photograph shows an apprentice receiving instructions from a foreman in properly finishing a mold. He also begins to learn something of the art of supervising workmen since he is given some of the responsibility of properly preparing the molds under the direct supervision of the ramming station foreman.

Sand Laboratory

The apprentice is then sent to the sand laboratory where he conducts the routine laboratory sand analysis, which consists of a greater variety of tests than those in the shop (Fig. 2). Here he tests all the sand used in the foundry, thereby learning the range of sand analysis for the different types of molding involved.

Green Sand Molding

During this second year, in the class room, the apprentice is studying green sand molding, core making, machine molding, dry sand molding, loam molding, mechanical principles, and begins his study of drawing and blueprint reading.

Inspection (III)

The third station consists of 3 months spent inspecting the product, where he learns to differentiate between the many causes for casting losses. In this department, the apprentice obtains a thorough working knowledge of all the specifications that the different castings

Fig. 2—Training in the sand testing laboratory also is on the apprentice's schedule.

Fig. 3—Core work is another phase of training that the apprentice receives. Here is an apprentice applying loam to a large one-eighth bend segment.

must meet. He learns the operation and maintenance of the grinding and cleaning equipment.

Lining and Coating

Three months are then spent in the pipe lining and coating department where he is taught the actual operation as well as the value of coatings and linings for pipe and fittings for the various service conditions encountered in their use. He is taught and performs the different tests used for properly preparing the different materials to be used for coating and lining the castings. Three months are spent in the machine shop, where the apprentice is given a working knowledge of the preparation and maintenance of all pipe foundry tools and equipment.

Pipe Production Office

The apprentice is then sent to the pipe production office for 3 months where he is given an opportunity to see all of the records that must be maintained with reference to production, loss, cost, etc. He records sales of the different products from the daily sales orders and keeps the proper balance with reference to the number of each type of casting required and those produced.

Production Duties

The apprentice has an opportunity during this period to learn some of the duties of the production superintendent and of the proper channels through which to handle the many different phases of the business, including maintenance, new equipment, procurement of raw materials, sequence of fulfillment of sales orders, etc.

Related Instruction

In the class room during this time, he should have completed drawing and blueprint reading, general appliances and processes, measuring instruments, grinding equipment, grinding practice, and should have started the study of English.

Core Work (IV)

During the fourth and last year of his training, the apprentice is sent to the core room for 6 months' experience. He acts as a sub-foreman and learns the operation of all the core making equipment, including the core ovens. He is taught the proper core mixtures, drying time and facing preparation (Fig. 3), as well as obtaining further experience in supervising men at work.

Production Orders

The last 6 months are spent in synchronizing the production shop operation with current orders. This consists of changing from one size to another, or

Table I.

Training Schedule for Production Apprentice Course

Place	*Time*	*Study Course*
Casting machine operation	4 months	Mathematics Elementary chemistry Metallurgy of iron
Control of casting weights	4 months	Metallurgy of steel Foundry chemistry Cupola practice
Cupola operation	4 months	Mixing cast iron Foundry sand and refractories
Chemical and physical laboratory	3 months	Green sand molding Core making Machine molding
Shop control of sand, blacking and clay	3 months	Dry sand molding
Mold ramming station	3 months	Loam molding
Sand laboratory	3 months	Mechanical principles Drawing and blue print reading
Pipe inspection	3 months	General appliances and processes
Coating and lining department	3 months	
Machine shop — manufacture and maintenance of foundry equipment	3 months	Measuring instruments Grinding equipment Grinding practice
Production shop office	3 months	English
Core production department	6 months	Industrial economics Control of quality of manufactured product
Equipment changes for current sales orders	6 months	Managing men at work Motion economy Time study Graphic presentation Final examination

from one class to another of the different castings, depending on orders and shipment promises. He is taught to make the fewest equipment changes possible without causing a delay in the completion of any sales orders, which leaves a lasting impression of the value of reducing the cost of such changes.

Related Instruction

The technical study covered in this last year of training includes industrial economics, control of quality of manufactured products, managing men at work, motion economy, time study, graphic presentation and a final examination.

Summary of Training

It can be seen from the above explanation that upon completion of the 4-year period, the production shop has a man who has been trained in all the operations necessary to the proper production of castings. This man has received technical training and study of all related subjects, as well as subjects that will tend to prepare him for a supervisory position. He is taught how to study the operation from a motion economy and time requirement standpoint, as well as how to express or present his ideas.

Although this apprentice course is new to us, we believe it one of the best and that it will develop men who will be capable of stepping into most any supervisory job in a production shop on very short notice, without interfering with production in any way. Furthermore, if the apprentice has a talent in some particular phase of the operation, it should be discovered during his travels from job to job and if this should happen it should pay dividends to both the apprentice and the company.

As a guide for anyone who is particularly interested in this training program, an outline is given in Table 1, which shows the position, time and course of study to be covered during the 4-year period.

Canadian Finds Foundry 400 Miles from North Pole

PAGE RIPLEY! A foundry 400 miles from the North Pole!

Norman C. MacPhee, metallurgist, Mines and Geology Branch, Canadian Department of Mineral Resources, Ottawa, Canada, a member of A.F.A., has sent us a quotation from a letter received by George Worthington, a coremaker, Alexander Fleck, Ltd., Founders and Machinists, Ottawa, Ontario, Canada, from his son, John Worthington, formerly a coremaker in the same shop, but now sergeant, Royal Canadian Engineers, Canadian Active Forces, in which he describes such a foundry.

Sergeant John took part in the recent "party" that the Canadians held for the "Jerries" at Spitzbergen, a small island east of Greenland and so far north of Norway (or what was Norway) that it is shown in maps of the Polar Regions. The information was passed for publication by the press censors of Canada and should be of considerable interest. It shows how necessary the casting of metals is to our present civilization and gives credence to the saying "Once a foundryman, always a foundryman."

Under the date of September 19, 1941, Sergeant John wrote that they "have just returned from a pleasure cruise to the Island of Spitzbergen" and gives details of the various operations performed. After these activities were carried out and evacuation of the inhabitants completed, he and a companion went on a sight-seeing tour through the town, which is situated on a hill about a mile and a half from the docks.

In the description of what they saw, we find, to continue in his own words: ". . . and, believe it or not, a foundry. Charlie Law and I went through it just for devilment. It was about the size of the core-room at Fleck's. They use the same principles as we did, only their molding sand seemed to be coarser. The core-room, a two-by-four bench, was cluttered with core boxes of different sizes. The sand was like a silica sand and with very little oil in it. Their patterns are not fitted with Dowel pins but, instead, use guides on the side of the box. The furnace (cupola) is fed from outside like Fleck's but is started with charcoal and wood. The scrap iron and coke are hauled up like a brick layer does. The molding boxes are like ours, only they have no cast iron boxes, all wooden ones with bars to reinforce them. They also use clay wash."

"So, tell the boys at Fleck's that there is a foundry just 400 miles from the North Pole (that ought to raise a laugh!)"

Executive Committee Meets in Chicago

A MEETING of the Executive Committee of your Association was held at the Palmer House, Chicago, Nov. 3, 1941, with President H. S. Simpson, National Engineering Co., Chicago, presiding. In addition to President Simpson, the Executive Committee is composed of Vice President D. P. Forbes, Gunite Foundries Corp., Rockford, Ill., Past President and Director L. N. Shannon, Stockham Pipe Fittings Co., Birmingham, Ala., Director F. J. Walls, International Nickel Co., Detroit; Past President and Director H. S. Washburn, Plainville Castings Co., Plainville, Conn., and Executive Vice President C. E. Westover. Also present were the following staff officers: R. E. Kennedy, Secretary; C. E. Hoyt, Convention and Exhibit Manager; J. Reininga, Assistant Treasurer, and N. F. Hindle, Assistant Secretary.

The meeting was devoted to a discussion of current problems of the Association, financial, technical and convention.

A study of core hardness revealed that the length of baking time materially affects the core hardness.

National Membership Committee Announces Chapter Contest

IN THE November issue of *American Foundryman,* we let you in on a little advanced "dope." On page 7, it was stated that the National Membership Committee had adopted a slogan "5000 in '42" and that it probably would sponsor a membership competition among the chapters similar to the contest held last year. We can now announce that the committee has perfected plans for a chapter membership contest and has established a basis for the competition whereby any chapter, regardless of size or location, will have an opportunity to win.

Basis for Contest

The committee has established a quota for each chapter based on the prospects within its territory. In this manner, those chapters which have done an outstanding job in their membership work and as a consequence of which have relatively few membership prospects, will have just as much opportunity to win the coveted first prize as will a chapter which has a large number of prospects in its territory. The quota is based on a standard percentage for all chapters of the non-member companies in each territory. Non-member companies are defined as those firms which are not represented in the chapter membership by Sustaining, Company or Personal memberships. In establishing the quota, a number of possible Affiliate memberships is included. The final figure will be based on gain in membership and not on new members alone. If a chapter should secure a large number of members but also have a large number of resignations which would completely balance the gain in new members, the progress of the chapter in membership would show zero. On the other hand, if a chapter succeeds in fulfilling its entire quota requirements, it will be shown as having a 1000 per cent batting average.

The accompanying table shows the *gain* in membership in chapters since July 1, 1941, and on the following pages are shown a list of 126 new members, two companies which have changed their membership from Personal to Company and one company which has changed its membership from Company to Sustaining during the interval from October 17 to November 15.

Table Shows Standing

The accompanying table shows the standing of each chapter in the membership contest as of November 15, 1941. As indicated, Wisconsin stands No. 1, Western Michigan, No. 2, and Northern Illinois-Southern Wisconsin, No. 3. The Wisconsin Chapter seems to have the first leg on the first-prize trophy. This chapter had to come from behind last year to win the coveted award. Northern California, which won second prize last year, is at present in 10th position, and Chesapeake, which took third place, is in 17th position. These two chapters will have to turn on the heat if they want to maintain the record they set last year.

The accompanying table is a fine indication of the equitable basis on which the chapter contest is established. Two of the Association's smaller chapters are in second and third place respectively. Their opportunities to secure new members are limited because there are relatively few foundries in their respective territories. The fact that they are in second and third place shows that they are doing a good membership job.

Commenting on the 126 new members shown in the list on the following pages, the Wisconsin Chapter wins the laurels again for this month with 17 new members. They are followed closely by the Birmingham District and the Chicago Chapters with 14 new members each and the Cincinnati District Chapter with 11 new members. It is interesting to note that 19 of 21 chapters have added new members to their roll during the past month. This is good evidence of the interest being shown in the membership contest.

Give the other fellow a break. Get him interested in membership so that he may share with you the advantages of membership in your Association.

Chapter Membership Progress Report

	Chapter	Membership as of 7/1/41	Gain in Membership as of 11/15/41	Chapter Standing
1	Wisconsin	310	56	185
2	Western Michigan	50	10	167
3	Nor. Illinois-Sou. Wisconsin	40	8	164
4	Cincinnati District	141	18	140
5	Chicago	425	36	114
6	Birmingham District	242	17	104
7	Michiana	67	10	78
8	Central New York	109	5	60
9	Central Indiana	127	8	59
10	Northern California	107	7	55
11	Metropolitan	172	11	40
12	Southern California	194	10	39
13	Western New York	151	4	38
14	Ontario	98	8	36
15	Quad City	129	3	30
16	Twin City	66	5	28
17	Chesapeake	154	7	26
18	Philadelphia	185	3	18
19	St. Louis District	135	0*	16
20	Northeastern Ohio	328	7	15
21	Detroit	231	0	0
		3461	233	

* While a chapter may show no increase in membership, it is possible to show a gain in the "Chapter Standing" column by converting a personal to a company membership or a company to a sustaining membership, since each class of membership carries a different credit in points.

NEW MEMBERS

The following list of new members of your Association is a tribute to the excellent job being done by both National and Chapter Membership Committees. They should be proud of the 126 new members and the three conversions reported below. However, the table of chapter standing in the National Membership Contest on the opposite page shows that there is still a job to be done. Let's make next month's list twice as long. To the new members, we welcome you to membership in the American Foundrymen's Association. We ask you to share in our work of spreading the gospel of more and better castings.

Sustaining From Company

Gunite Foundries Corp., Rockford, Ill. (D. P. Forbes, President).

Company From Personal

Beckett Bronze Co., Muncie, Ind. (C. Beckett, Treas.).
Koehring Co., Foundry Division, Milwaukee, Wis. (L. V. Tuttle, Fdry. Mgr.).

Birmingham District Chapter

***W. Carson Adams, Birmingham, Ala.**
***Alabama Foundry Co., Birmingham, Ala. (P. J. McCarthy, Supt.).**
Eugene Bates, Foreman, Central Foundry Co., Bessemer, Ala.
R. A. Beattie, Foreman, Central Foundry Co., Bessemer, Ala.
P. M. Bethea, Foreman, Central Foundry Co., Bessemer, Ala.
F. H. Dennis, Foreman, Central Foundry Co., Bessemer, Ala.
Joe Franklin, Foreman, Central Foundry Co., Bessemer, Ala.
Clarence Lawrence, Foreman, Central Foundry Co., Bessemer, Ala.
James W. Moore, Member, President's Staff, American Cast Iron Pipe Co., Birmingham, Ala.
Will S. Moore, Foreman, Central Foundry Co., Bessemer, Ala.
Charles Nixon, Foreman, Central Foundry Co., Bessemer, Ala.
M. J. Sanford, Foreman, Central Foundry Co., Bessemer, Ala.
B. M. Skates, Foreman, Central Foundry Co., Bessemer, Ala.
D. C. Williams, Melting Dept. Clerk, American Cast Iron Pipe Co., Birmingham, Ala.

Central Indiana Chapter

L. W. Crandall, Personnel Supv., Perfect Circle Co., New Castle, Ind.
Fred E. Kurtz, Electric Steel Castings Co., Indianapolis, Ind.

Central New York Chapter

H. W. Barnes, Engr. & Sales Mgr., Dolomite Products Co., Rochester, N. Y.
***Frazer & Jones Co., Syracuse, N. Y.**

Chesapeake Chapter

Everett S. Johnson, Apprentice, Naval Gun Factory, Washington Navy Yard.
Walter J. Landgraf, Crafton, Pa., Salesman, S. Obermayer Co., Chicago, Ill.
Elder J. Malburg, Molder, Naval Gun Factory, Washington Navy Yard, Washington, D. C.
Henry M. Witmyer, Owner, Henry M. Witmyer Co., Baltimore, Md.

Chicago Chapter

***A.B.C. Pattern & Foundry Co., Chicago, Ill. (Al. F. Cervenka).**
***Ace Foundry Co., Chicago, Ill. (Grant V. W. Roth, Secretary).**
Edwin Brown, Molding Foreman, American Steel Foundries, East Chicago, Ind.
Louis Chick, Foreman, Continental Roll & Steel Foundry Co., East Chicago, Ind.
Richard T. Davis, Foreman, Continental Roll & Steel Foundry Co., East Chicago, Ind.
Paul A. Dougher, Works Engr., American Steel Foundries, East Chicago, Ind.
Morris Horwitz, Student, Illinois Institute of Technology, Chicago, Ill.
William A. Huber, Project Mgr., La Salle Peru Work Experience Center, NYA, Peru, Ill.
***Interstate Smelting & Refining Co., Chicago, Ill. (Martin Rothschild).**
W. P. O'Brien, W. D. Allen Manufacturing Co., Chicago, Ill.
Henry L. Stein, Interstate Smelting & Refining Co., Chicago, Ill.
Erwin F. Thomas, Sand Tester, Crane Company, Chicago, Ill.
Walter Donald Weldon, Foreman, American Steel Foundries, East Chicago, Ind.
Edward W. Winicki, General Core Foreman, American Steel Foundries, East Chicago, Ind.

Cincinnati District Chapter

Emil Albrecht, Treas., Aluminum Foundry Co., Cincinnati, Ohio.
***American Pumps, Inc., Cincinnati, Ohio (Robert E. Schlegel, Secretary-Treasurer).**
Harry Anderson, Foundry Foreman, Aluminum Industries, Inc., Cincinnati, Ohio.
Geo. D. Behlen, Works Mgr., U. S. Electrical Tool Co., Cincinnati, Ohio.
***Buckeye Iron & Brass Works, Dayton, Ohio (Wm. P. Huffman, President and Treasurer).**
Eugene L. Bunting, Brass Fdry. Supt., The Lunkenheimer Co., Cincinnati, Ohio.
***Central Brass & Aluminum Co., Cincinnati, Ohio (E. L. Cunningham, President).**
Harry Cutter, Brighton Foundry Co., Cincinnati, Ohio.
George A. Goodpaster, Ass't Supt., Williamson Heater Co., Cincinnati, Ohio.
Harry F. Greek, The Hill & Griffith Co., Cincinnati, Ohio.
Platt Horton, Pres. & Gen'l Mgr., Wilmington Castings Co., Wilmington, Ohio.

Metropolitan Chapter

Bernard Brennan, Leadman, Wright Aeronautical Corp., Paterson, N. J.
John P. Rozema, Sand Control, Wright Aeronautical Corp., Paterson, N. J.

Michiana Chapter

Galen O. McCray, Ass't Foreman, Bendix Products Div., of Bendix Aviation Corp., South Bend, Ind.

No. Illinois-So. Wisconsin Chapter

H. D. Chamberlain, Foreman, Fairbanks, Morse & Co., Beloit, Wis.
J. H. McIntyre, Cleaning Room Foreman, Fairbanks, Morse & Co., Beloit, Wis.
Howard W. Miner, Fdry. Met., Fairbanks, Morse & Co., Beloit, Wis.
A. D. Wilkinson, Mach. Molding Foreman, Fairbanks, Morse & Co., Beloit, Wis.

Northeastern Ohio Chapter

Albert Luce, Gen'l Foreman, Sterling Foundry Co., Wellington, Ohio.
Richard J. Tatousek, Ass't Fdry. Met., Otis Steel Co., Cleveland, Ohio.

Northern California Chapter

Evan N. Davideko, Met., Enterprise Engine & Foundry Co., So. San Francisco, Calif.
John S. Faust, Foreman, General Metals Corp., Oakland, Calif.
M. E. Ginty, Foreman, General Metals Corp., Oakland, Calif.
W. W. Stevens, Salesman, Electro Metallurgical Sales Corp., San Francisco, Calif.
Lynn A. Vietor, Mgr., Acme Foundry Co., Eureka, Calif.
John A. Watson, Foreman, General Metals Corp., Oakland, Calif.

*All Company Members Set in Bold Face Type.

Ontario Chapter

Archie Graham, Owner & Mgr., Galt Testing Laboratory, Galt, Ont., Can.
R. H. Lindley, Steel Company of Canada, Ltd., Hamilton, Ont., Can.
Gordon L. Memory, Sales Mgr., North American Refractories, Ltd., Hamilton, Ont., Can.

Philadelphia Chapter

Edward Ferguson, Mgr., North American Smelting Co., Philadelphia, Pa.
Robert S. Mason, Molding Foreman, Crucible Steel Casting Co., Lansdowne, Pa.
E. L. Mosebach, Met. Dept., Bethlehem Steel Co., Bethlehem, Pa.
***North American Smelting Co., Philadelphia, Pa. (Robert M. Carrigan).**

Quad-City Chapter

***Fairbanks, Morse & Co., East Moline, Ill. (P. E. Wright, Fdry. Supt.).**
Ward L. Hunt, Ass't Supt., The Dexter Co., Fairfield, Iowa.
John N. Johnson, Fdry. Met., Deere & Co., Moline, Ill.
H. A. Shay, Supt., J. I. Case Co., Rock Island, Ill.

Southern California Chapter

Norman Henricks, Salesman, Snyder Foundry Supply Co., Los Angeles, Calif.
E. R. McDaniels, Musto-Keenan Co., Los Angeles, Calif.
Miller Peterson, President, Monarch Pattern & Foundry Co., Los Angeles, Calif.
Elmer Podas, Owner, Podas Foundry & Manufacturing Co., Los Angeles, Calif.
Arnold C. Rau, House Salesman, Snyder Foundry Supply Co., Los Angeles, Calif.

Twin-City Chapter

Eugene Blair, Student, University of Minnesota, Minneapolis, Minn.
Merle Kinkela, Student, University of Minnesota, Minneapolis, Minn.
Joseph Kinsmiller, Fdry. Foreman, Minneapolis Electric Steel Castings Co. (Minn.).
William D. Kuszler, Supt., Minneapolis Electric Steel Castings Co. (Minn.).
W. W. Snyder, Chief Clerk, American Brake Shoe & Foundry Co., Brake Shoe & Castings Div., Minneapolis, Minn.

Western Michigan Chapter

Luther C. Curl, The Foundries Materials Co., Coldwater, Mich.
***Dake Engine Co., Grand Haven, Mich. (Arthur Green, Manager).**
Kenneth E. Davis, National Motor Castings Div., Campbell, Wyant & Cannon Foundry Co., South Haven, Mich.

Western New York Chapter

John D. Amoroso, Foundryman, Sterling Engine, Buffalo, N. Y.
***Doehler Die Casting Co., Batavia, N. Y. (G. F. Hodgson, Plant Met.).**
Ralph Fava, Fdry. Supt., Sargent & Greenleaf, Inc., Rochester, N. Y.
R. W. Lewis, Patt. Shop Foreman, Symington-Gould Corp., Rochester, N. Y.
Albert M. Petz, Ass't Fdry. Supt., Symington-Gould Corp., Depew, N. Y.
***Sargent & Greenleaf, Inc., Rochester, N. Y. (E. P. Meade Foundry Manager).**
Paul J. Strassberger, Salesman, Dayton Core Oil Co., Dayton, Ohio.
Harold J. Struebing, Buffalo, N. Y., Salesman, Electro Refractories & Alloys Corp., Buffalo, N. Y.
James L. Yates, Chief Inspector, Worthington Pump & Machinery Corp., Buffalo, N. Y.

Wisconsin Chapter

Anthony L. Barutt, Fdry. Foreman, Bucyrus-Erie & Co., South Milwaukee, Wis.
Louis Hayden, Foreman, Koehring Co., Foundry Div., Milwaukee, Wis.
John L. Holy, Patt. Shop Supt., Nash-Kelvinator Corp., Kenosha, Wis.
Leo Kolinski, Allis-Chalmers Manufacturing Co., Milwaukee, Wis.
Joseph W. Koresh, Ampco Metal, Inc., Milwaukee, Wis.
Fred Krempel, Foreman, Koehring Co., Foundry Div., Milwaukee, Wis.
A. L. McKay, Prod. Engr., Kaukauna Machine Corp., Kaukauna, Wis.
***Mid-City Foundry Co., Milwaukee, Wis. (C. S. Wieland, President).**
Leo Moczulewski, Ass't Fdry. Met., Nash-Kelvinator Corp., Kenosha, Wis.
Alvin Roskom, Foreman, Koehring Co., Foundry Div., Milwaukee, Wis.
Albert Salo, Ass't Foreman, Nash-Kelvinator Corp., Kenosha, Wis.
Tony Samolinski, Foreman, A. J. Lindemann & Hoverson, Milwaukee, Wis.
Joseph A. Scheer, Ampco Metal, Inc., Milwaukee, Wis.
A. R. Segal, Chemist, Kearney & Trecker, Milwaukee, Wis.
***Silver Steel Co., Racine, Wis. (Barney Silver, President).**
Edmund Thiel, Process Inspector, Allis-Chalmers Manufacturing Co., Milwaukee, Wis.
Paul Voit, Foreman, Koehring Co., Foundry Div., Milwaukee, Wis.

Outside of Chapter

George Wm. Buchanan, Chemist, Unitcast Corp., Toledo, Ohio.
***Buckeye Traction Ditcher Co., Findlay, Ohio (Wilbur C. Paulin, Fdry. Supt.).**
Allan Coykendale, Met., Buckeye Traction Ditcher Co., Findlay, Ohio.
Eugene W. Getz, Personnel Dir., Unitcast Corp., Toledo, Ohio.
M. J. Gruhler, Jr., Foreman, Unitcast Corp, Toledo, Ohio.
A. G. Heilman, Owner, Tiffin Foundry, Tiffin, Ohio.
Robert T. Jansen, Met., Unitcast Corp., Toledo, Ohio.
John S. Jones, Met., Vanadium Corp. of America, Bridgeville, Pa.
***Modern Pattern Works, Toledo, Ohio (Fred H. Schill, Partner).**
G. T. Myers, Core Room Foreman, Unitcast Corp., Toledo, Ohio.
Brock L. Pickett, Chief Inspector, Unitcast Corp., Toledo, Ohio.
The Public Library, Civic Center, Denver, Colo.
H. H. Serrelo, Foreman, Unitcast Corp., Toledo, Ohio.
Frank J. Vollmayer, Jr., Cleaning Room Foreman, Toledo, Ohio.

Book Review

A Good Mechanic Seldom Gets Hurt, by H. R. Graman; published by American Technical Society; paper cover with spiral binding; containing 94 pages; price 50 cents. Most of the rules set forth in this booklet are not new safety rules but they are presented in a new and different style that makes them interesting to read. The author has endeavored to take the numerous safety rules and organize them so as to give the beginning craftsman an idea of what to look for when he is working in a machine shop. Young workers, as well as old, would benefit from reading this book. Young workers would realize that they have only themselves to blame for any injuries resulting from careless practices. The old workers would have a chance to brush up on safety measures and often offer a word of advice to the younger machine shop employes. With the creation of such characters as Safety Joe and the twins, Accident Moe and Careless Boe, that author has achieved much in giving the booklet a more personal and human approach. A booklet of this kind would be well to use as a safety text in machine shop apprentice courses as well as in courses for related industries.

NEW CHAPTER OFFICERS

C. F. Joseph
Saginaw Malleable Iron Div., General Motors Corp., Saginaw, Mich.
Director
Detroit Chapter

H. L. Klopf
Fairbanks Morse & Co., Beloit, Wis.
Vice Chairman
Northern Illinois-Southern Wisconsin Chapter

R. Latham
Bethlehem Steel Co., Bethlehem, Pa.
Director
Philadelphia Chapter

J. R. Cochran
Sundstrand Machine Tool Co., Foundry Division, Rockford, Ill.
Technical Secretary
Northern Illinois-Southern Wisconsin Chapter

W. F. Haggman
Foundry Specialties Co., Huntington Park, Calif.
Director
Southern California Chapter

P. T. Bancroft
Moline, Ill.
Director
Quad City Chapter

W. A. Hambley
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Director
Wisconsin Chapter

H. A. Deane
American Brake Shoe & Foundry Co., Mahwah, N. J.
Director
Metropolitan Chapter

S. D. Russell
Phoenix Iron Works, Oakland, Calif.
Director
Northern California Chapter

R. J. McSherry
Studebaker Corp., South Bend, Ind.
Director
Michiana Chapter

R. L. Ogden
Stockham Pipe Fittings Co., Birmingham, Ala.
Director
Birmingham District Chapter

E. F. Hess
Ohio Injector Co., Wadsworth, Ohio
Director
Northeastern Ohio Chapter

Purdue Conference Stresses Foundry Problems in National Defense

ON October 17-18, a joint regional foundry conference was held at Purdue University, West Lafayette, Ind., sponsored by the Central Indiana, Michiana and Chicago Chapters of A.F.A. in connection with Purdue University. Approximately 225 registered for the meetings held in the Purdue Memorial Union Building on the university campus. The outstanding points in connection with the conference were the exceptional interest shown in the various sessions and their informality.

Student Meeting

Of special interest at the conference was a student meeting held on Friday morning. Arrangements had been made by the conference committee with the faculty of the engineering schools to allow students interested in the subject of castings to attend this meeting. Nearly 200 attended. The meeting was addressed by Col. W. W. Rose, executive vice president, Gray Iron Founders' Society, Cleveland, O., who selected for his subject "Properties and Uses of Castings." C. E. Westover, executive vice president, A.F.A., acted as chairman of the meeting and introduced Col. Rose.

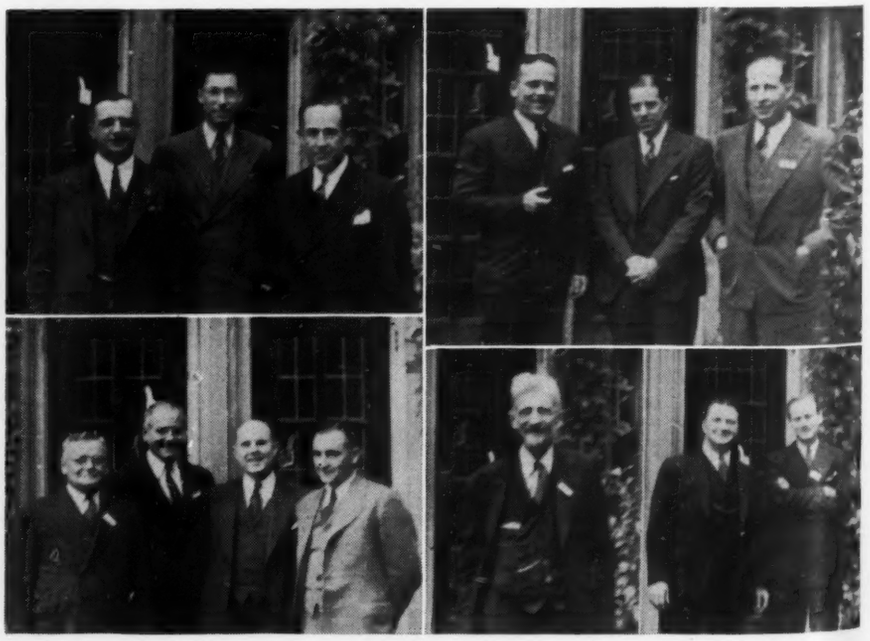
The program arranged by the joint conference committee consisted of simultaneous sessions on Friday and Saturday morning and afternoon, on gray iron, malleable, steel and non-ferrous subjects. "Substitutions in Raw Materials for Melting Because of Shortages" was the subject of M. J. Gregory, factory manager, foundry division, Caterpillar Tractor Co., Peoria, Ill., at the first gray iron session. Mr. Gregory had brought samples of various types castings being made by his company and a display illustrating the methods by which they were made. The various parts of the display used by Mr. Gregory, in explaining the various points in his lecture, are shown in the accompanying illustration. Following the session, Mr. Gregory graciously presented this display to the University. The same subject was discussed by P. A. Paulson, Gunite Foundries Corp., Rockford, Ill., at the malleable session. D. B. Reeder, metallurgist, Electro Metallurgical Sales Corp., Chicago, addressed the steel session on "Present Situation in Alloys," while W. B. George, foundry engineer, R. Lavin & Sons, Inc., Chicago, discussed "Melting of Non-Ferrous Metals to Meet Physical Properties and Specifications" at the non-ferrous session.

Discusses Shortages

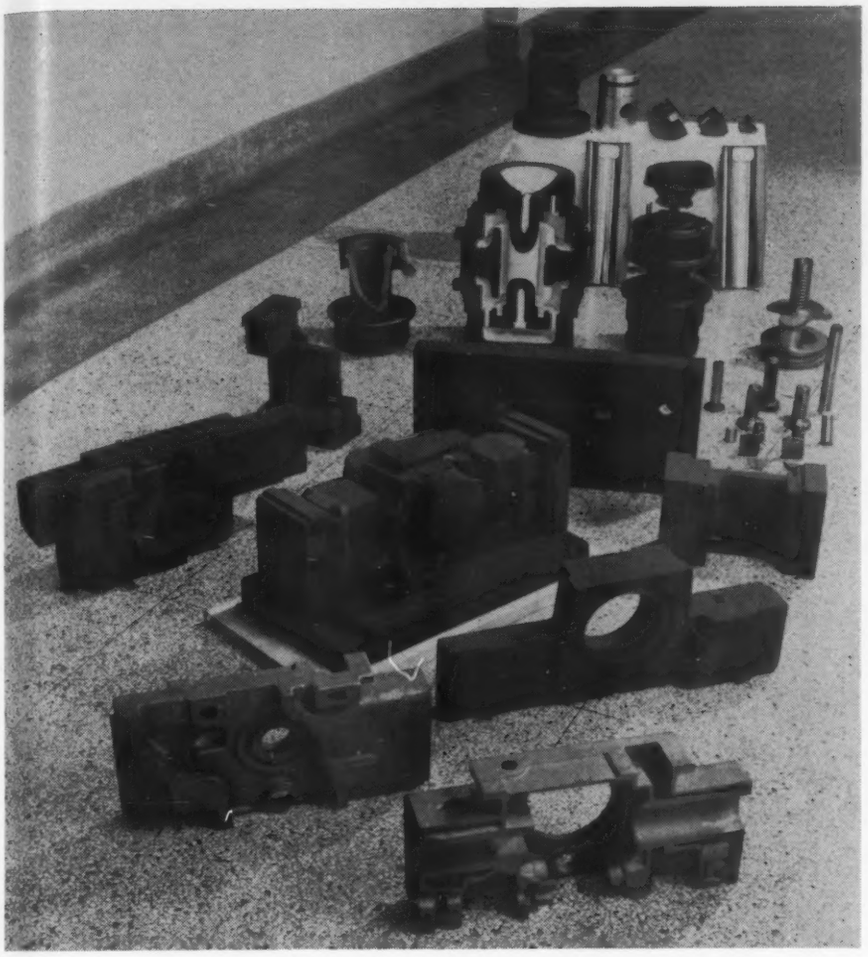
At the afternoon sessions, Dr. James T. MacKenzie, American Cast Iron Pipe Co., Birmingham, Ala., addressed the gray iron group on "Effect on Melting Practices Due to Substitutions of Materials Because of Shortages," while Carl F. Joseph, metallurgist, Saginaw Malleable Iron Div., General Motors Corp., Saginaw, Mich., discussed "Replacement of Non-ferrous and Forged Steel Parts with Pearlitic Malleable Iron" at the malleable session. A very interesting discussion on "Controlled Directional Solidification" was presented by F. A. Melmoth, vice president, Detroit Steel Casting Co., Detroit, at the steel session. "Core Practices and Molding Sands" held the interest of the non-ferrous foundrymen at the non-ferrous session. The talk was delivered by H. W. Dietert, president, Harry W. Dietert Co., Detroit.

Hold Joint Dinner

That evening the joint chapter dinner was held with J. D. Burlie, engineer, Sheet Metal, Foundry and Woodwork, Western Electric Co., Chicago, and chairman of the general conference committee, as chairman, and H. B. Harvey, president, Indiana Foundry Corp., Muncie, Ind., and chairman of the Central Indiana Chapter, as co-chairman. Dr. A. A. Potter, dean of engineering, Purdue University, gave an excellent address of welcome in which he stressed the necessity for cooperation in the country's National Defense effort. The address of the evening was presented by Earl L. Shaner, president, Penton Pub-



Personalities at the Purdue regional conference.



Samples of various type castings being made at the Caterpillar Tractor Co., Peoria, Ill., that were exhibited by M. J. Gregory at the Purdue regional conference.

lishing Co., Cleveland, O., who spoke on "Shortages—Material and Otherwise." Mr. Shaner discussed not only the question of materials shortages but also the shortages in leadership and perspective that exist today and pointed out that to a certain extent we all are responsible for these conditions.

Simultaneous sessions of the four branches of the industry were scheduled for Saturday morning and afternoon, October 18, but it was decided that the morning and afternoon sessions should be combined to allow those attending to return to their businesses. The first speaker on the gray iron program was Elmer J. Carmody, foundry engineer, Charles C. Kawin Co., Chicago, who discussed "Modern Methods of Gating and Risering." Mr. Carmody was followed by W. G. Reichert, general foundry metallurgist, American Brake Shoe & Foundry Co., Mahwah, N. J., who gave a very interesting discussion on "Factors Affecting Surface Finish of Castings." The combined malleable session first heard C. C. Lawson, superintendent, Wagner Malleable Iron Co., Decatur, Ill., discuss "Gating and Molding Practice for Malleable Castings" and later James H. Lansing, shop practice engineer, Malleable Founders' Society, Cleveland, spoke on "Factors Affecting Surface Finishing and Methods of Cleaning." At the steel session, W. Harvey Payne, president, Hydro-Arc Furnace Corp., Chicago, presented a paper that centered around "Electric Furnace Construction." In the absence of B. J. Aamodt, foundry superintendent, National Malleable & Steel Castings Co., Chicago, due to illness, Mr. Reeder, who had taken part in the previous day's program, presented the paper on "Electric Furnace Melting" prepared by Mr. Aamodt. The session continued with a paper by A. W. Gregg, Whiting Corp., Harvey, Ill., on "Triplex Melting of Steel" which involved the use of cupola, converter and the electric furnace.

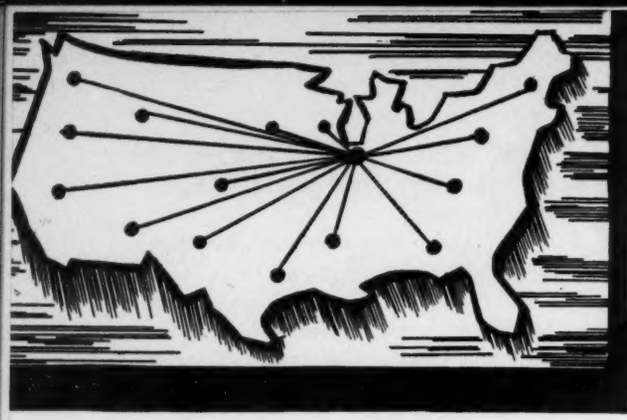
At the non-ferrous session "Aluminum Castings" was discussed by F. E. Carl, assistant foundry superintendent, Delco-Remy Div., General Motors Corp., Anderson, Ind., while M. E. Brooks, Dow Chemical Co., Bay City, Mich., discussed "Magnesium Castings." Following the presentation of these two talks, W. B. George, who had taken part in the previous day's program, discussed the subject of "Gates and Risers for Non-Ferrous Castings," illustrating his talk by sketching on the blackboard the methods used to gate and riser various types of non-ferrous castings.

At the conclusion of the program, all present were of the opinion that the 1941 regional conference was one of the most interesting they had ever attended and individually congratulated the committee on the excellent choice of subjects and speakers.

Sand Compression Testing Machine Wanted

DR. H. RIES, technical director, A.F.A. Foundry Sand Research Committee, 401 Thurston Ave., Ithaca, N. Y., would like to secure a hand-power operated compression machine for testing sand specimens. This machine will be used in the work of the Foundry Sand Research Committee, especially in connection with the research now being conducted on the effect of elevated temperatures on the properties of sand. Any member having such a machine which is not now in use and who would care to assist the committee by donating this piece of equipment, please get in touch with Dr. Ries.

Present in the office of many foundry executives and engineers can be found the A.F.A.'s Cast Metals Handbook. Have you a copy handy? It is designed to give engineers and designers reliable working data on the present available properties in cast metals. A valuable tool in this day and age.



Chapter Activiti

Toledo District Foundrymen to Organize as 22nd Chapter

A PETITION for a chapter organization was signed at a meeting of A.F.A. members and guests held October 31 at the Hillcrest Hotel, Toledo, Ohio. The petition has since been approved by the A.F.A. Board of Directors and a chapter organization meeting is being called for Friday, December 5, at Toledo.

The October meeting was the third foundry meeting held in this district this year, these meetings being sponsored by the Association through its local committee. Those serving on the committee under the chairmanship of V. E. Zang, works manager, Unitcast Corp., Steel Casting Div., are Ralph L. Binney, president, Binney Casting Co.; R. A. Clark, Toledo Machine & Tool Div., E. W. Bliss Co.; Leighton M. Long, metallurgist, Bunting Brass & Bronze Co.

Dietert Talks on Core Practices

At the meeting on October 31, H. W. Dietert, Harry W. Dietert Co., Detroit, gave a technical discussion of core room practice. In his presentation he covered in an interesting manner a comparison of binders, their properties and applications, baking theories and other points of direct practical interest. Some of the material reviewed is that which is being collected for the coming A.F.A. book, "Core Practices and Theories," to be published as the 1942 A.F.A. Annual Convention Lecture course.

Sign Petition

V. E. Zang, chairman of the local committee, presided and explained the purpose of these foundry meetings. He stated that it was the hope of the committee to start an A.F.A. chapter in that district. R. G. McElwee, Vanadium Corp. of America, a director of the Detroit chapter, and V. C. Bruce, Buckeye Products Co., a director of the Michiana chapter, who were present, explained how their districts were enjoying the benefits of getting together through chapter meetings, and advocated a similar organization for Toledo. Chairman Zang then called upon R. E. Kennedy, secretary of the A.F.A., who discussed the national organization, its committee work and how chapters could be organized. Mr. Zang then invited those present to sign the petition requesting approval of the A.F.A. Board to call a chapter organization meeting. This chapter when organized will be the 22nd, the first chapter having been organized in 1934.

Dr. Stork Drops A Bundle of Joy at Toledo

Sketch drawn by G. W. Waterman, Bureau of Ships, U. S. Navy, used for announcing the arrival of "baby" chapters.

THE sketch shown was used this month in announcing the arrival of the Association's 22nd chapter at Toledo. The original drawing of the stork was made by G. W. Waterman, Bureau of Ships, U. S. Navy. This drawing is not new to some members as it has been in use since it was first employed by the Chesapeake chapter in the fall of '40 on their organization meeting announcement. Since that initial appearance this sketch has appeared several times in conjunction with other chapter's activities. Mr. Waterman's art is appreciated by many.

Chesapeake Chapter Again Makes History

By Frederick Bruggman,* Baltimore, Md.

ON Saturday, October 25, twenty-five of the Baltimore members journeyed by bus to the Hotel Hamilton, Washington, D. C., for a special meeting to celebrate the first anniversary of the chapter. What a celebration! What an anniversary! Chapter Vice-Chairman J. E. Crown, Naval Gun Fac-

*Gibson & Kirk Co., and Reporter, Chesapeake chapter.

The anniversary party of the Chesapeake Chapter held in Washington, D. C., was indeed a marker in the progress of the chapter. Top row (left)—The gang from Maryland Car Wheel Co. Center (left to right)—A. L. Fairlay, OPM, Raw Materials Procurement Dept., Washington, D. C.; N. F. Hindle, Assistant Secretary, A.F.A., Chicago, Ill.; L. P. Robinson, Director, Core Oil Sales, Werner G. Smith Co., Cleveland, O.; Chapter Chairman E. W. Horlebein, Gibson & Kirk Co., Baltimore, Md., and Chapter Vice Chairman J. E. Crown, U. S. Navy Yard, Washington, D. C. Right—Mentzer and Brashears strike a pose for the camera. Bottom (left)—Part of the gang from Baltimore. Right—The gang before dinner.
(Photos courtesy Fred Bruggman, Gibson & Kirk Co., Baltimore, Md.)

tory, Washington, D. C.; Earl J. Bush, U. S. Navy Yard, Washington, D. C.; C. L. Frear, U. S. Navy Dept., Bureau of Ships, Washington, D. C.; H. F. Taylor, U. S. Naval Research Laboratory, Washington, D. C.; and C. M. Saeger, Jr., Bureau of Standards, Washington, D. C., the committee in charge of arranging this outstanding affair, certainly deserve the Nobel prize for their efforts. The program was one of the finest ever presented to the members of the Chesapeake chapter and everybody will remember it as one of the highlights of the season.

The session opened at 5 p. m. with A. L. Fairlay, O.P.M. Raw Materials Procurement Dept., who discussed and answered questions about priorities as regards foundrymen. At 6:45 p. m. the Baltimore members arrived and were greeted in the Blue Room by a reception committee of about 100 members and guests of the chapter, including among them R. E. Kennedy, Secretary, A.F.A. What a greeting after a forty-mile bus ride, on the heavily trafficked Washington Blvd. After milling around greeting old friends, meeting new people and partaking of refreshments provided by the committee, the maitre de hotel announced the first and only call for dinner.

The Baltimore group that journeyed up to Washington to attend the chapter's first anniversary meeting.

Between courses of a southern fried chicken dinner, which included everything from soup to salad, our old friend, L. P. Robinson, "Robbie" to those present, director, core oil sales, Werner G. Smith Co., Cleveland, Ohio, explained how, through a strange circumstance, he had the privilege of observing the personal habits and love life of pullets, roosters, etc., as well as experiencing the thrill of suddenly becoming a farmer through no fault of his own. Mr. Robinson's version of how he went in the chicken business via the mail order method and finally discovered that every time a chicken laid an egg he lost money, was full of wit and humor. Yes, sir, a nights of nights for the Chesapeake chapter! The photographs taken at random speak for themselves. The real part of the program started at about 8:30 p. m., when Mr. Robinson proved that he also knows a few things about core oils and how cores should be made, and proceeded to impart his knowledge of this subject to the 140 people present. During his talk, Mr. Robinson pointed out that cores are somewhat similar to a loaf of bread; they have to be baked through at the proper temperature to be any good. Slow and thorough baking of cores is essential and it is

The committee that arranged for this special meeting, celebrating the first anniversary of the Chesapeake Chapter, was composed of (left to right) J. E. Crown, E. J. Bush, C. L. Frear, H. F. Taylor, C. M. Saeger, Jr., and E. W. Horlebein.
(Photo courtesy Fred Bruggman, Gibson & Kirk Co., Baltimore, Md.)

impossible to rush them through to save time, because invariably the cores will look perfect on the outside but the inside will not be baked and will cause castings to blow. Also, Mr. Robinson emphasized that it is necessary to leave temperature control and proper circulation of heat in the core oven alone and advised that air circulators are being used successfully in many plants throughout the country. A short discussion period followed.

Kuniansky Discusses Scrap Usage at Metropolitan Meeting

K. A. De Longe,* New York City, N. Y.

"FOUNDRYMEN must learn to take a more charitable point of view of the man who made the castings we are today using as scrap," stated Max Kuniansky, general manager, Lynchburg Foundry Co., Lynchburg, Va., in addressing a group of some 60 members and guests at the regular meeting of the Metropolitan chapter, November 3, at the Essex House, Newark, N. J. Mr. Kuniansky spoke on the subject "Scrap Metals for Making High Quality Castings in the Cupola." The meeting was under the technical chairmanship of Donald J. Reese, International Nickel Co., New York.

Mr. Kuniansky criticized foundrymen in general for being overconscious of the type of scrap used in making up their charges and suggested that if more attention were paid to technical control the field of usable scrap could be broadened considerably. The present day shortage of pig iron and accepted types of scrap is increasing the trend toward the use of melting materials which formerly passed by as unsuitable. Mr. Kuniansky stated their present cast iron scrap included stove plate, cotton mill and automotive parts, car wheel and machinery scrap, while their steel scrap consisted of automobile rims and the like.

The speaker told of the melting practice at the four foundries operated by his company, including shops making plow parts, centrifugally cast pipe, chemical industry castings and machine tools. He pointed out that the practice described was that used in their shops but that it was not necessarily recommended for other foundries.

In the pipe foundry where an analysis of 3.60 T.C. and 2.00 Si is used the charge consists of 88 per cent scrap, stated the speaker. In the coke splits 19 per cent of pitch coke is used in order to obtain this level of carbon content and 7-lb. of soda ash is added per ton of metal which results in a reduction in sulphur content from 0.13 to 0.08 per cent. Mr. Kuniansky described their method of making pig iron by melting charges of 100 per cent steel scrap and casting into 6-in. diameter cylinders which are white and easily broken. The carbon content of this metal runs from 3.15 per cent at the beginning of the heat to approximately 2.50 per cent after the melting is well under way.

The speaker stated it is their practice to separate iron, steel and non-ferrous metals in automotive scrap, saying that the value of the bearing metals recovered as enough to pay for the cost of separation. Manganese steel scrap is used as a source of manganese. Mr. Kuniansky said that with their extended use of scrap metals they regularly analyze their production for such elements as arsenic, tin and phosphorus which might prove very troublesome when present in considerable amounts. The lengthy discussion which followed Mr. Kuniansky's witty presentation gave testimony to the high quality of his talk.

*International Nickel Co., and Secretary, Metropolitan chapter, A.F.A.

Northeastern Ohio Hears about Silvery Pig

By Pat Dwyer*, Cleveland, O.

AT a largely attended meeting of the Northeastern Ohio chapter, Nov. 13, at the Tudor Arms, Cleveland, announcement was made by James G. Goldie, foundry instructor, Cleveland Trade School, of the coming apprenticeship contest to be staged in connection with the convention and exhibition of the A.F.A. scheduled for April in the Cleveland Public Auditorium. Brief addresses were delivered by C. E. Hoyt, Chicago, exhibition manager, and by Fred Walls, International Nickel Co., Detroit, member of the A.F.A. Board of Directors. Entertainment feature of the meeting was supplied by Howard M. Duff in a clever and witty running comment on a series of cartoons sketched rapidly.

Bradley H. Booth, metallurgist, Jackson Iron & Steel Co., Jackson, Ohio, presented an interesting and scholarly address on silver pig iron in the production of which his company has specialized for many years. The first part of the address was devoted to a historical review of iron making in India, China and Japan and later by many centuries in Germany and England. American iron manufacture began in Virginia where the first plant and the entire settlement were destroyed by the hostile Indians. Shortly afterward a blast furnace was established on the Saugus river, Mass., near Salem. Gradually as the population increased other iron working establishments were set up in New York, Pennsylvania and Ohio. Old-time records show that at one period 69 blast furnaces were operated in southern Ohio. They were small, crude plants, invariably built on a hill side to facilitate charging the furnace through an open top and with a capacity that ranged between 3 and 7 tons per week. Remains of many square stone stacks still are in existence in Ohio and Pennsylvania. The second part of the address, illustrated by slides, showed the author's plant in former days and contrasted early operating features with the present efficient and modern

*Engineering Editor, "The Foundry," Penton Publishing Co., and Reporter, Northeastern Ohio Chapter.

methods and equipment. The third part of the address dwelt on the characteristics of silvery pig containing from 11 to 15 per cent silicon and the manner in which it may be incorporated with advantage in various cupola mixtures.

MacKenzie Speaks at Northern California

By Geo. L. Kennard,* San Francisco, California

A SPECIAL meeting was called of the Northern California chapter in order that they could take advantage of the presence of Dr. James T. MacKenzie, metallurgist, American Cast Iron Pipe Co., Birmingham, Ala. A good crowd was on hand to welcome the speaker and show him some Northern California hospitality.

Mr. MacKenzie spoke on centrifically cast pipe. A great deal of interest was shown while Dr. MacKenzie gave a detailed account of the process before having W. L. Blair, local representative, American Cast Iron Pipe Co., show a set of pictures of the plant and the equipment necessary for production. The audience was pleased and accounted it as one of the best and most spectacular programs the chapter has yet had.

*Northern California Foundrymen's Institute, and Secretary-Treasurer, Northern California chapter.

Kuniansky Speaks before New England on Foundry Operation

By M. A. Hosmer*, Boston, Mass.

THE regular monthly meeting of the New England Foundrymen's Association was held at the Engineers' Club, Boston, on November 12, and was attended by one hundred members and guests. The usual dinner was served, following which President Charles O. Butler, Warren Pipe Co. of Mass., Inc., Everett, Mass., announced that at a meeting of the executive committee of the association, it was voted to hold a New England Foundry Conference in the spring of 1942. Walter Saunders, Jr., Walter Saunders & Co., Providence, R. I., was chosen chairman of the conference. President Butler also announced that plans were under way for the annual meeting of the New England Foundrymen's Association which would be held on Jan. 14, 1942.

Mr. Butler then introduced Dr. Leonard Guenther, a noted German refugee, who presented a most interesting coffee talk on the subject, "I Saw Hitler's Uprising."

The technical session consisted of a very fine address by Max Kuniansky, general manager, Lynchburg Foundry Co., Lynchburg, Va., who spoke on "Gray Iron Founding Operation."

Mr. Kuniansky, who is a recent recipient of the W. H. McFadden Medal by the A.F.A., discussed general foundry and metallurgical practice as carried out in his plants at Lynchburg and Bradford. He explained that one of the principle products of the company was pipe which was cast centrifugally in water cooled metal molds. Loam molding, which is becoming more and more a rare art, is carried out in one division of the plant. Among other difficulties to worry the foundryman he mentioned the problem of where the future molder would be obtained and the present impossibility of many foundries to obtain good scrap. His particular practice involved the manufacture of a so-called synthetic pig iron by melting and pigging a 100 per cent steel charge in the cupola. This gives a material which in turn is remelted and pitch coke is used to obtain the required resulting carbon. Alloys are used in the form of briquettes in the cupola and late additions in the ladles.

A chill test is run on every ladle poured and in this connection he pointed out that a constant temperature of pouring the test is necessary to obtain chill tests which mean something. Physical tests and frequent analyses are run to insure good control. The general pouring practice in this shop is to tap hot and pour relatively cold. The phosphorus is kept low as this is necessary to facilitate carbon pickup. A mixing ladle is used

*Chemist, Hunt-Spiller Mfg. Co., and Reporter, New England Foundrymen's Association.

Right—More pictures taken at the Northern California Chapter's outing. Top—A hook or a slice? Center—Bob and Ed Noack with their war clubs. Bottom—Birmingham, Golyeanai and Blocker pose between shots.

and desulphurizing is the regular practice. He also discussed in detail the use of risers and stated that in their practice they were able to keep the number of these down to a minimum.

Wisconsin Hears Taylor Talk on Americanism

By George K. Dreher,* Milwaukee, Wis.

THE Wisconsin chapter was treated to a very inspiring talk on "Americanism" by Carl Taylor, executive secretary, Wisconsin Building and Loan League, at the Friday, October 17, meeting held in the Green Room, Schroeder Hotel, Milwaukee.

Carl Taylor's theme hinged around the question, "What Made America a Great Country?" He prefaced his talk with a description of the foreign elements in the streets of many of the large cities during the past several years, wherein approximately one-third of this Nation's population displayed their dissatisfaction with our mode of living, and also their willingness to trade our life for something unknown in the form of highly advertised Communism, Fascism or Nazism.

Carl Taylor defined the three reasons most commonly advanced for America's greatness as follows:

1. We are rich in natural resources.

(Many people have stated that this Nation would be great no matter who was here or what form of government we had.) The speaker countered this, and stated that other countries have equal resources and have not realized any benefit from them.

2. The melting pot of America has gathered in the best thinking of the Old World and, again, any form of government would be equally successful.

Mr. Taylor gave examples of other amalgamations of thought in history and cited their resulting failures.

3. That America is great because its people have been rewarded in proportion to the good a person does.

The lecturer cited the failure of other nations to appreciate many of their geniuses and gave examples showing how free thought was consistently smothered. Even Steinmetz was tarred and feathered and ridden out of Germany and France, after which he came to America, where his genius was allowed to develop. Steinmetz lived at the time of Thomas Edison and, while Thomas Edison was considered rather queer by his contemporaries, he was nonetheless permitted to pursue his goal in life.

Somehow Americans must recapture the thought that labor is really a joy and that an idle mind is truly the "devil's workshop." That the managers and leaders in America are those who have come up the hard way in a country which offers them this opportunity, whether they are born with a silver spoon in their mouth or not, and that capital is the means with which both labor and management are provided with equipment to give us a truly abundant life. The present philosophy in government is to place a stigma on labor, making a criminal out of a man who has the energy and effort to want to progress beyond his station in life.

*Mgr., Ampco Metal, Inc., and Secretary, Wisconsin chapter.

Picture taken at the October meeting of the Wisconsin Chapter. The men are (left to right) Chapter President A. C. Ziebell, Universal Foundry Co., Oshkosh, Wis.; Carl Taylor, executive secretary, Wisconsin Building and Loan League, Milwaukee, Wis., and Chapter Director Harry Ladwig, Allis-Chalmers Mfg. Co., Milwaukee, Wis.
(Photo courtesy John Bing, A. P. Green Fire Brick Co., Milwaukee, Wis.)

Reese Talks on Cupola Practice at St. Louis

By J. W. Kelin,* St. Louis, Mo.

THAT ever-popular subject for the iron foundryman, "Cupola Operation," was presented before the November 14 St. Louis District Chapter meeting by Donald J. Reese, International Nickel Co., New York City.

The meeting was held at the DeSoto Hotel, St. Louis, with 80 members and guests gathering for the dinner. Chapter Chairman Carl Morken in opening the meeting had the new members and out-of-town visitors introduced. He then announced that the Board of Directors, on behalf of the chapter, was presenting a formal invitation to the A.F.A. to hold the 1943 annual convention in St. Louis. R. E. Kennedy, A.F.A. Secretary, and a guest at the meeting was asked to make some comments on the National Association's work.

Mr. Reese, the speaker of the evening, was introduced as the chairman of the A.F.A. Cupola Research project and as one who had been foremost in promoting an intensive study of all factors in cupola operation. In his discussion, he reviewed those phases of cupola operation which

*Federated Metals Div., A. S. & R. Co., and Secretary-Treasurer, St. Louis District chapter.

he felt most important in obtaining economical and satisfactory melting. Mr. Reese stressed the use of types of scrap and the results to be obtained with different proportions of steel scrap in the mix. Problems involved in meeting the present shortage of scrap were reviewed. Following Mr. Reese's talk, an extensive discussion of problems encountered in local shops ensued.

Chairman Russell Hard, Entertainment Committee, directed attention to the annual stag party to be given at the DeSoto Hotel, Thursday evening, Dec. 11. R. E. Williamson, chairman, Membership Committee, pointed out progress of the work done by that group.

Modrall Speaks at First Chicago Meeting

THE Chicago chapter opened its new chapter activities year at a new meeting place, Top of the Town Restaurant, and had on hand 140 members and guests to welcome J. F. Modrall, employment assistant, Eli Lilly & Co., Indianapolis, Ind., the speaker of the evening. The meeting was in the hands of Chapter Chairman L. L. Henkel, Interlake Iron Co., Chicago. Introducing the speaker was Chapter Vice Chairman A. G. Gierach, American Manganese Steel Div., who also is program chairman.

Mr. Modrall presented a most informative discussion on his subject, "Merit Rating Plan." The speaker outlined the merit rating plan that has been put into operation at his plant and told of how it affected everyone from the president to the janitor. The ratings are taken every six months of the employe and kept as a permanent record. These records are referred to when a wage increase is sought or a promotion occurs in the plant. Cards used in making up an employe's record deal primarily with his work and what type it falls into, either good, average or poor and another type card pertaining to his ability to get along with others; attitude toward his work, supervisors and plant; and other similar questions. The type merit rating plan discussed has been in operation at Eli Lilly for some time and has met with more success than had previous plans. The discussion period provided ample opportunity for further questioning of the author and of solving many pressing problems on this subject.

Special Meeting

A special meeting of the Chicago chapter was called for November 13 at the Top of the Town Restaurant to hear S. M. Roberts. Mr. Roberts, division of contract distribution, O.P.M., Chicago, spoke on "The Government Plan for Securing Defense Orders." Approximately 70 members and guests were present for this talk and Chapter Chairman L. L. Henkel, Interlake Iron Co., presided.

The speaker gave a brief but useful explanation of the workings of this department and emphasized that all foundries should register with their office as soon as possible. He discussed the ways and means of securing government orders through the contract distribution office and told of many facilities open to learn what had to be produced. One of the many ways is to receive the weekly bulletin prepared by the Chicago office. Clinics and special trains, where parts are exhibited and where foundrymen can go to see what has to be made, are being held throughout the country. Mr. Roberts urged the co-operation of every foundry in this work as the amount to be done is tremendous.

Northern California Chapter members had one of the largest gatherings at their annual outing. These photographs help to illustrate the point. Top (left)—Bossi and Poltenghi try pitching horseshoes for a prize. Top (right)—Pete Valentine in the center of a singing group. Insert (right)—Group discussions were quite the common thing. Bottom (left—left to right)—C. V. Petty, J. F. Driscoll, M. M. Morison and G. L. Kennard. Bottom (right—left to right)—E. J. Lonn, D. M. Crain, R. C. Noah, S. D. Russell and G. L. Kennard.

These pictures were taken at the current outing of the Northern California Chapter. Top row (left)—Golfers at the 19th hole. (Center)—Valentine and Driscoll cool off in the pool. (Right)—Pete Valentine leads the singing. (Insert)—Gilfrey Ward ready to tee off. Bottom row (left)—Smiling for the camera man. (Center)—The prizes. (Right)—King and Page playing "barnyard golf."

(All photos of Northern California chapter outing courtesy P. C. Valentine, Del Monte Properties Co., San Francisco, and S. D. Russell, Phoenix Iron Works, Oakland.)

Detroit Learns of Ford Motor Company Foundry Operations

By O. E. Goudy,* Detroit, Mich.

E. C. JEATER and G. Vennerholm, metallurgists, Ford Motor Co., Detroit, Mich., assisted by R. Korpi, addressed the Detroit chapter on "Foundry Operations at the Ford Motor Co." This was the first meeting of the season, October 16, held at the Fort Wayne Hotel, with approximately 100 in attendance and Chapter Chairman V. Crosby, Climax Molybdenum Co., presiding.

Several of the newer phases of foundry operation were covered by Mr. Jeater and Mr. Vennerholm and more particularly as they pertain to defense operations, especially that of making various castings centrifugally. By means of slides, Mr. Jeater pictured how some of the steel castings, such as airplane cylinder liners, are now cast centrifugally in a steel mold, pointing out in detail each operation, also showing the advantages over forgings. It was especially interesting to learn of the magna flux test as applied to these parts, thereby showing the superiority of a centrifugal cast liner.

Steel pistons for automobiles, another phase covered by Mr. Vennerholm, showed that these castings, made completely in a green sand mold and being very thin, have a weight slightly under that of aluminum as formerly used.

Other phases covered were those of airplane crankshafts, centrifugally cast gear blanks, and the making of pusher rods in a permanent mold.

Another important operation illustrated was the method of mixing cupola metal with blast furnace metal and maintaining a uniform analysis and temperature in a large holding furnace which supplies metal for the pouring of cylinder blocks by means of two shuttle cars.

A general discussion followed, during which many questions were answered. Before adjourning, Mr. Crosby introduced W. P. Woodside, Founder and Past President, American Society of Metals, who told of some of his earlier experiences in connection with foundry work.

* Kelsey-Hayes Wheel Co., and Reporter and Director, Detroit chapter.

Bolton at Cincinnati Presents Non-Ferrous Study

By Henry M. Wood,* Cincinnati, O.

MEETING at the Cincinnati Union Terminal Restaurant, November 11, some 70 members and guests attended a technical session with John W. Bolton, metallurgist, Lunkenheimer Co., Cincinnati, O., discussing "Practical Approaches to Some Non-Ferrous Foundry Problems."

Due to Mr. Bolton's wide experience in both the non-ferrous and ferrous fields the talk was not restricted to non-ferrous problems. The speaker presented a wide variety of foundry problems and answers in an interesting manner. Questions put up to Mr. Bolton, following his talk, concerned iron, steel, brass, bronze and other metals and showed the keen attention paid by the audience to the speaker.

* W. W. Sly Mfg. Co., and Secretary, Cincinnati District chapter.

Welding Cast Iron Presented at N.I.-S.W.

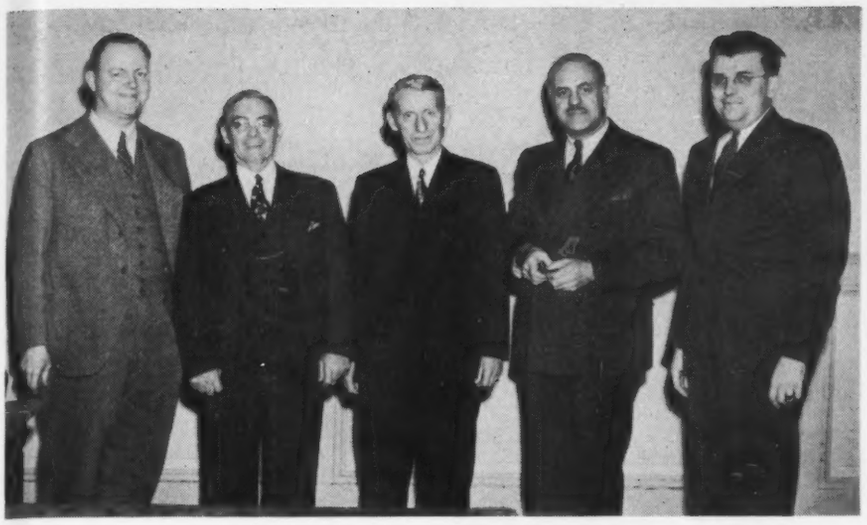
By J. R. Cochran,* Rockford, Ill.

SPEAKER for the November 11 meeting of the Northern Illinois-Southern Wisconsin chapter was H. O. Quartz, welding engineer, Allis-Chalmers Mfg. Co., West Allis, Wis. Also on hand, for this get-together held at the Hotel Faust, Rockford, Ill., were H. S. Simpson, Association President, National Engineering Co., Chicago, and Executive Vice-president C. E. Westover, Chicago. Chapter Chairman G. W. Minert, Gunite Foundries Corp., Rockford, Ill., was the presiding officer.

President Simpson spoke briefly on the casting promotion campaign which is getting under way and Executive Vice-president Westover talked on membership.

The speaker for the evening, Mr. Quartz, explained the development of welding as applied to cast iron in the last 20 years. He

* Metallurgist, Sundstrand Machine Tool Co., Foundry Div., and Technical Secretary, Northern Illinois-Southern Wisconsin chapter.



At the November meeting of the Northern Illinois-Southern Wisconsin chapter were these chapter and national officers—(left to right)—Association Vice-President D. P. Forbes, Gunite Foundries Corp., Rockford, Ill.; H. O. Quartz, speaker, Allis-Chalmers Mfg. Co., West Allis, Wis.; Association President H. S. Simpson, National Engineering Co., Chicago, Ill.; Association Executive Vice-President C. E. Westover, Chicago, Ill.; and Chapter Director F. N. Rundquist, Beloit Castings Co., Beloit, Wis.
(Photo courtesy John Bing, A. P. Green Fire Brick Co., Milwaukee, Wis.)

said that a welded casting can be guaranteed to be equal to one that has not been welded and that if it cannot, welding is a waste of time. In the case of large castings a great deal of trouble is justified to save castings. Naturally no foundry welds any more of its new castings than is necessary but often in the case of broken or worn castings in the field, welding will save costly shutdowns and both time and material in getting a machine back on the job. Mr. Quartz gave some specific examples where such cases arose that necessitated the welding process so as not to interrupt the flow of material in manufacturing plants. A short but informative discussion period followed the talk.

Westover Speaks at First Pittsburgh Meeting

By R. L. Hartford,* Pittsburgh, Pa.

PITTSBURGH Foundrymen's Association opened its technical year October 20 with a dinner meeting at Hotel Roosevelt, Pittsburgh. Principal speaker was C. E. Westover, executive vice president, American Foundrymen's Association, Chicago, who outlined pattern mounting procedure, using a special plywood backing, which enabled economical production on a run as low as six pieces.

He also showed slides depicting the foundry exhibit, which covers 2,600 square feet of floor space in the Museum of Science and Industry, Chicago, and described the work being done at that exhibit. The Association, stated the speaker, is now endeavoring to further the use of castings in our defense program. One of the primary attempts in this direction is the preparation of a movie showing the work in the foundry industry. Prepared for general distribution, the film is calculated to increase public awareness of the capabilities of the industry.

The meeting was under the direction of C. J. Scheckhaus, new president of Pittsburgh Foundrymen's Association.

*Penton Publishing Co., *"The Foundry,"* and Reporter, Pittsburgh Foundrymen's Association.

Gregg Talks Cupola Practice at Michiana

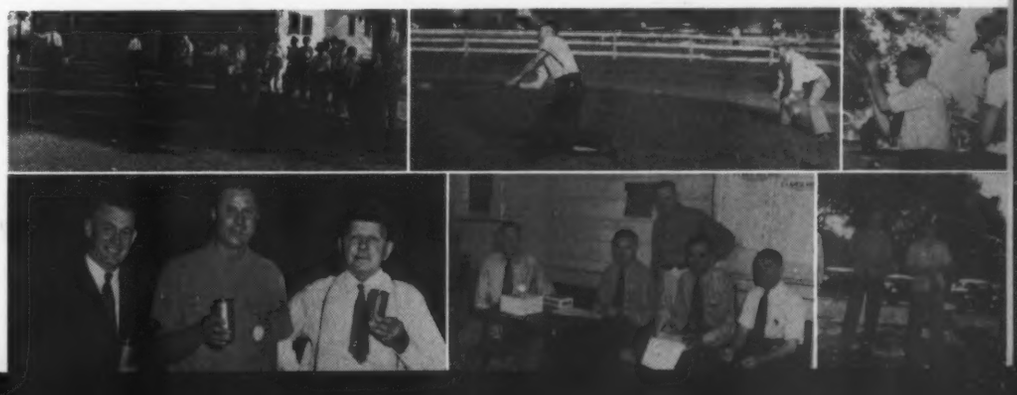
By L. L. Andrus,* Mishawaka, Ind.

PRESIDING at the November 11 meeting of the Michiana chapter held at the Hotel LaSalle, South Bend, was E. C. Bumke, Oliver Farm Equipment Co., South Bend, Ind., chapter chairman. A group of 90 were on hand to hear A. W. Gregg's

At the October meeting of the Northern Illinois-Southern Wisconsin Chapter was R. C. Kresge, personnel director, Link-Belt Co., Chicago, Ill. (center). At the left is Chapter Chairman G. K. Minert, Gunite Foundries, Rockford, Ill., and right is Chapter Vice-Chairman H. L. Klopf, Fairbanks Morse and Co., Beloit, Wis.
(Photo courtesy John Bing, A. P. Green Fire Brick Co., Milwaukee, Wis.)

*Vice-President, Charge of Sales, American Foundry Equipment Co., and Secretary-Treasurer, Michiana chapter.

Candid camera pictures taken at the current outing of the Michiana Chapter.
(Photos courtesy L. F. Tucker, City Pattern Works, South Bend, Ind.)



Michiana Chapter members had plenty to do to pass the time away at their annual outing, *(Photos courtesy L. F. Tucker, City Pattern Works, South Bend, Ind.)*

presentation on "Cupola Practice and Mechanical Charging."

The speaker discussed each of the important factors to be watched in cupola operation, using a chart setting forth the essential data for each standard size cupola. His talk also covered the usual types of mechanical charging equipment, and was illustrated with photographs taken in foundries of various sizes. An open forum discussion period following Mr. Gregg's talk brought out some interesting and valuable information.

Priorities and Allocations Topic at Philadelphia

By B. H. Bartells,* Philadelphia, Pa.

THE November meeting of the Philadelphia chapter was held at the Engineers Club, Philadelphia, Pa., Friday evening, November 14. There were one hundred and sixty present. The Chairman, Harry Reitinger, U. S. Pipe and Foundry Co., Burlington, N. J., presided.

The after dinner speaker, Victor L. Short, president, Institute of Human Science, is widely known as "The Man With the Million Dollar Mind." His talk on human science and memory demonstrations was an outstanding feature.

The main speaker, Frank G. Steinebach, Editor, "The Foundry," is Chief of the Foundry Equipment and Supplies Unit, Tools Section, Division of Production, Office of Production Management. Mr. Steinebach's talk on priorities, allocations and problems involved was most timely and interesting. Mr. Steinebach pointed out the importance of the foundry industry in defense, as a large number of the OPM orders apply to the production of castings. He also explained a number of details regarding the recently issued Preference Rating P-22.

* Instructor, University of Pennsylvania and Reporter, Philadelphia Chapter.

Forbes and Lincoln at Western New York

By Eliot Armstrong,* Buffalo, N. Y.

GUEST of honor at the November 7 meeting of the Western New York chapter was Association Vice President Duncan P. Forbes, Gunite Foundries Corp., Rockford, Ill. Chapter Chairman R. K. Glass, Republic Steel Corp., Buffalo, had charge of the meeting which was held at the Hotel Touraine, Buffalo.

As a tribute to Vice President Forbes a record attendance was recorded. Mr. Forbes gave a very brief outline of the Association's activities for this year and

*Inter-Allied Foundries of New York State, Buffalo, N. Y., and Secretary, Western New York chapter.

Wisconsin chapter Regional Conference Committee plans interesting program —(left to right)—Chapter Treasurer R. F. Jordan, Sterling Wheelbarrow Co.; Professor J. F. Oesterle, University of Wisconsin, Madison, Wis.; Chapter Director Harry Ladwig, Allis-Chalmers Mfg. Co., West Allis; Chapter President A. C. Ziebell, Universal Foundry Co., Oshkosh, Wis., and Chapter Vice-President H. C. Waldron, Nordberg Mfg. Co.

(Photo courtesy John Bing, A. P. Green Fire Brick Co., Milwaukee, Wis.)

pointed out how the chapters could assist in many of the different efforts.

Speaker of the evening was R. F. Lincoln, Osborn Manufacturing Co., Cleveland, Ohio. Mr. Lincoln, who is treasurer, Northeastern Ohio chapter, gave an interesting and informative presentation on "Molding Machines and Core Machines." To add to his talk and help illustrate numerous points the speaker used slides.

Sand Behavior Discussed at Central Indiana

By R. A. Thompson,* Indianapolis, Ind.

EARL WOODLIFF addressed a group of 125 foundrymen gathered at the Washington Hotel for the November meeting of the Central Indiana chapter. The subject of the talk was "Sand Behavior in the Mold."

The speaker, who is a sales engineer, Harry W. Dietert Co., Detroit, Mich., gave a clear picture of the behavior of sand in the mold, explaining "sand terms" and made some very informative sketches concerning sand problems. He climaxed his presentation by explaining the use of the dilatometer and then, using various types of sand samples, showed how it was operated.

*Electric Steel Castings Co., and Secretary, Central Indiana chapter.

The meeting was in charge of H. B. Harvey, president, Indiana Foundry Corp., Muncie, chapter chairman. I. R. Wagner, general manager, Electric Steel Castings Co., Indianapolis, introduced the speaker and Eugene Smith, E. W. Smith, Inc., Evansville, Ind., conducted the discussion period that followed the author's paper.

Sound Movie Shown at Western Michigan

By Max A. Amos,* Muskegon, Mich.

BEFORE a group of 90 local foundrymen, meeting at Occidental Hotel, Muskegon, Mich., November 3, the Whitehead Bros. Co., Buffalo, N. Y., presented their sound movie "Sand." V. L. Whitehead, Jr., gave a short introduction to the colored film presentation before it was shown to the members and guests. Chapter Chairman D. F. Seyferth, West Michigan Steel Foundry Co., Muskegon, Mich., had charge of the meeting.

In his presentation Mr. Whitehead told of the one hundredth anniversary his company was celebrating and the desire to give to the industry something interesting and informative through the presentation of this movie.

*Standard Automotive Parts Co., and Secretary-Treasurer, Western Michigan chapter.

Chapters Presented One Way to Serve Non-Ferrous Foundry Industry

RECENTLY the Office of Price Administration communicated with the A.F.A. concerning a study being made of the price history, covering the past five years, on the products of brass and bronze foundries. Realizing that the non-ferrous foundries had no national trade association to give this information, the cooperation of the A.F.A. chapters was sought in securing the names of the brass and bronze foundries in the respective areas. Executive Vice President Westover has passed this request on to the chapters urging cooperation with O.P.A.

The Chicago chapter recently offered its services to the non-ferrous foundries of the distrist through calling a meeting to discuss the securing of defense work through the O.P.M. Division of Contract Distribution. At a meeting held November 13, S. M. Roberts of the O.P.M. addressed the Chicago chapter non-ferrous section advising as to how the situation can be met. As a result of this meeting, the non-ferrous foundrymen formed a committee to study the matter and report to a meeting to be held December 8 in Chicago.

It is believed that the chapters have a real opportunity to be of service to the non-ferrous foundrymen of their districts in aiding them to organize to meet such problems as are coming up at the present time. The A.F.A. office is offering its facilities to act as a go-between for these various chapter groups and the O.P.M. and O.P.A., with the thought that the work in the several chapter districts can be coordinated.

Birmingham Lecture Course Rolls Along

THE first session of the apprentice training course sponsored by the Birmingham chapter was held Oct. 10 at the Tutwiler Hotel, Birmingham.

J. A. Bowers, American Cast Iron Pipe Co., Birmingham, chapter chairman, gave the opening talk. "All Welded Steel Ships," a film, was shown by the Ingalls Shipbuilding Corporation. L. H. Jones lectured during the showing and answered questions following the presentation.

The second meeting, held at the Tutwiler Hotel, was made up of a trio of speakers. R. L. Ogden, Stockham Pipe Fittings Co., Birmingham, gave a short talk on small dry sand cores. The speaker brought along the smallest fittings Stockham makes and the cores used in making the castings. Speaker number two was Paul W. Townes, American Cast Iron Pipe Co., Birmingham, who spoke on medium sized dry sand cores. J. V. Davis, the third speaker, gave a discussion on large dry sand cores and brought along some drawings of the core for an 84-in. fitting made by his company, the U. S. Pipe & Foundry Co., Bessemer.

Thomas Bellsnyder, president, Jefferson Foundry Co., Birmingham, was the speaker at the third session of the chapter's lecture course which changed its meeting place to the auditorium, Alabama Power Co. The subject of Mr. Bellsnyder's talk was "Gating and Risering Gray Iron Castings" and it was agreed upon by all that it was one of the best talks, with black board illustrations, the chapter has had.

The pictures on the next page reveal what was done at a recent meeting of the Northeastern Ohio chapter in which the apprentices were honored guests. Those who won prizes were given certificates and their employers awarded plaques on which was inscribed the winner's name, his company connection and in what division of the contest he won a place.

This year, just as has been done in previous years, the Association announces that the annual apprentice contest will be held in conjunction with the convention which will be held in Cleveland. Prizes of $30, $20 and $10, respectively, for the first, second and third place winners in each of the four competitions of the national contest have been approved by the A.F.A. Board of Awards. The National A.F.A. Apprenticeship Training Committee furnishes blueprints for the pattern making competitions and patterns for the three molding competitions.

Those desiring to have their apprentices compete in the contests should address the American Foundrymen's Association, 222 West Adams St., Chicago, Ill.

Apprentice Contests Promote Friendly Competitive Spirit

WILLIAM S. KNUDSEN, president of General Motors and now head of the O.P.M., should know a thing or two about manufacturing. Not so long ago he said: "The best possible start which a young man can have in the automobile industry is a craft, skill as a machinist for instance, or in molding." It seems that large corporations know that at the bottom of every industry are trades — important trades — and surely foundry work is one of those important trades.

Many companies have much to offer an apprentice while teaching him to become a molder, coremaker or patternmaker but much is gained through the competitive spirit engendered by contests such as those sponsored by the American Foundrymen's Association in molding and patternmaking. Each year these contests have been growing in number of entries. Numerous plants, and the Association's chapters, hold local contests to determine whose patterns or castings will be sent to represent that area in the National contest.

Among the leaders in sponsoring apprenticeship activity is the Northeastern Ohio chapter in Cleveland, O. This chapter holds a local contest each year in which keen competition is traditional. Some time later in the chapter year, these young men, who have spent so much time and energy to make the contest a success, are entertained as guests of the chapter and awards are presented to them as well as to their employers in an interesting ceremony.

Metropolitan Chapter and Rutgers University Sponsor Engineering Defense Training

THE Metropolitan Chapter has announced that, in cooperation with Rutgers University, three foundry courses are to be given at Cleveland High School, Elizabeth, N. J., as a part of the educational activities of the chapter. The courses are to be conducted by Rutgers under the authority of the U. S. Office of Education under its plan of encouraging defense training courses on engineering, science and management.

The three foundry courses, open to graduates of high schools or the equivalent plus current employment in foundry work, will cover (a) Metallurgy and Metallography, (b) Melting of Metals for the Foundry, and (c) Foundry Materials. The courses are given to assist in the up-grading of technical and semi-technical men now engaged in foundry work.

These courses will run for eight weeks, starting November 24, with one meeting a week in each course. The first course (a) meets on Thursday evenings from seven to ten, the second (b) Tuesday evenings, and the third (c) on Wednesday evenings. Tuition will be free. Donald J. Reese, International Nickel Co., New York, a past chairman of the chapter, is chairman of the education committee. Course (a) will be given by Roy M. Allen, consulting metallurgist, Bloomfield, N. J. Mr. Allen is well known in A.F.A. circles, having given the 1939 lec-

ture course at the Cincinnati convention. Fred G. Sefing, International Nickel Co., and chairman of A.F.A. Committee on Cooperation with Engineering Schools, will give the course (b), and R. E. Nesbitt, foundry instructor, Pratt Institute, Brooklyn, a past treasurer of the chapter, will supervise course (c) on "Foundry Materials."

The Metropolitan Chapter last year sponsored its first educational course under the direction of chapter chairman, Dr. N. E. Woldman, Bendix Aviation Div., Eclipse Aviation Corp., Bendix, N. J.

New Committee Members

Non-Ferrous Division — Subcommittee on Silicon Bronzes —Recommended Practices Committee.

A. E. St. John, Federal Metals Division, American Smelting & Refining Co., 120 Broadway, New York, N. Y.

Gray Iron Division—Committee on Fluidity Testing.

H. F. Taylor, Met., Naval Research Laboratory, Anacostia Sta., Washington, D. C.

Gray Iron Division—Advisory Committee.

F. K. Vial, Vice Pres., Griffin Wheel Co., 445 N. Sacramento Blvd., Chicago, Ill.

Gray Iron Division — Cupola Research Steering Committee.

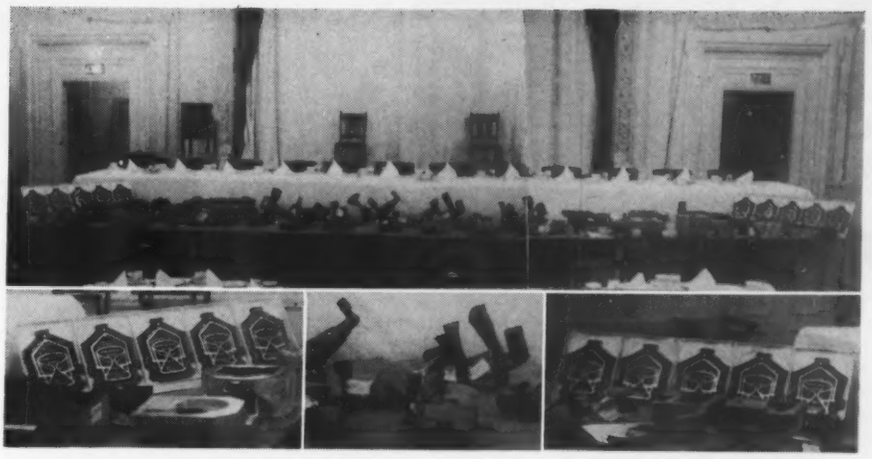
D. J. Reese, Met., International Nickel Co., 67 Wall St., New York City, Chairman.

Max Kuniansky, General Mgr., Lynchburg Foundry Co., Lynchburg, Va.

John Lowe, Battelle Memorial Institute, 505 King Ave., Columbus, Ohio.

S. C. Massari, Res. Met., Association of Manufacturers of Chilled Car Wheels, 445 N. Sacramento Blvd., Chicago, Ill.

R. G. McElwee, Mgr., Fdry. Alloy Div., Vanadium Corp. of America, 2440 Book Bldg., Detroit, Mich.



At a recent meeting of the Northeastern Ohio Chapter the membrs had as their guests the winners of the local and national apprentice contests. Top—The table containing the prize winning castings and patterns of the apprentices. At each end of the table can be seen the plaques awarded to the companies whose apprentices won places in the national apprentice contest. Bottom (left and right)—A close-up view of the plaques. Center—A few of the prize winning castings.

(Photos courtesy N. Farmer, Sand Products Corp., Cleveland, Ohio)

Recipients of the various awards presented at the meeting of the Northeastern Ohio Chapter. The employers of the winners received the plaques while the apprentices received certificates.

(Photos courtesy N. Farmer, Sand Products Corp., Cleveland, Ohio)

Abstracts

NOTE: The following references to articles dealing with the many phases of the foundry industry, have been prepared by the staff of *American Foundryman*, from current technical and trade publications.

When copies of the complete articles are desired, photostat copies may be obtained from the Engineering Societies Library, 29 W. 39th Street, New York, N. Y.

Alloys

COPPER-NICKEL. *"Complex Copper-Nickel Alloys,"* by Ernest F. Nippes, *The Metal Industry* (London), vol. 48, No. 23, June 6, 1941, pp. 486-490. It was found in this investigation that aluminum and zirconium were very effective as hardeners in alloys where the ratio of copper-nickel was three to one and one to one. It is is not certain what actually causes precipitation hardening in these alloys, but from the contours of the iso-hardness charts it can be seen that a compound of aluminum and zirconium, containing about 70 per cent Al, may be the cause. Other investigations are under way to definitely establish the compound. A summary of the best ageing conditions for the two selected alloys with corresponding properties are shown in a table of this paper. (Al.)

NICKEL TYPE. *"Balancing the Composition of Cast 25 Per Cent Chromium, 12 Per Cent Nickel Type Alloys,"* by J. T. Gow and O. E. Harder, *A.S.M. Preprint No. 21,* 1941, pp. 1-66. Commercial alloys representative of 1937 production were studied to establish a base line of properties such as strength and ductility "as cast" and "as aged" when tested at room temperature, strength and ductility in short-time tension tests at elevated temperatures, and creep behavior at elevated temperatures. Properties were correlated with microstructures. Work was then directed to studying the functional effects of the essential alloying elements and to balancing the composition with reference to austenite- and ferrite-promoting elements to produce wholly austenitic alloys. The conditions for producing wholly austenitic alloys are presented. The effects of some addition agents are presented. It is shown that austenitic alloys have better retained ductility after heating to high and intermediate temperatures and better strength at elevated temperatures and they have much better load-carrying capacity at elevated temperatures as determined by short-time tension and creep tests than partly ferritic alloys. (Al.)

Aluminum Alloys

AGE HARDENING. *"Indium and Other Elements in Age Hardenable Aluminum Alloys,"* by W. H. Fraenkel, *Metals and Alloys,* vol. 14, No. 2, August, 1941, pp. 168-169. Only recently has indium become available in limited commercial quantities. As a result some researches on its possible uses as an alloying element have been, and are still being, conducted. This article discusses some of the results of an investigation on the effect of indium on heat-treatable aluminum alloys, a subject on which very little has been published. It has been found that small amounts of indium have a decided influence on the age hardenability of these alloys. The increase in hardness during hardening takes place at a slower rate in the duralumin type of alloy and at a faster rate in alloys without magnesium, is of some technical interest. (Al.)

HIGH SILICON. *"High Silicon Aluminum Alloys," Canadian Metals and Metallurgical Industries,"* vol. 4, No. 10, October, 1941, p. 279. A review of an article taken from *Metallurgia* concerning the silicon aluminum series of alloys, with a silicon content up to 12.5 per cent. Alloys of this type are employed for purposes such as turbine gear castings, radiators, parts of pumps, gear box castings, and housings of various types. They are characterized by high corrosion resistance, good foundry characteristics, low specific gravity, and high ductility and impact strength. The inclusion of small percentages of manganese and magnesium in casting alloys of this type allows them to be heat-treated with improvement of mechanical properties. Alloys of this type have been extensively developed in both Great Britain and Germany. (Al.)

PISTONS. *"Unsoundness in Gravity Die-Cast Silicon-Aluminum Alloy Pistons,"* by R. T. Parker, *The Metal Industry* (London), vol. 48, No. 18, May 2, 1941, pp. 387-389. This paper, prepared for presentation to the Institute of Metals, is an account of an investigation, under practical conditions of the incidence of unsoundness in the skirts of small 12 per cent silicon-aluminum alloy pistons. The factors investigated were gas contamination, machining technique, and temperature of the die-assembly in which the piston was cast. (Al.)

Analysis

BESSEMER CONVERTER. *"Analysis of the Generation and Delivery of the Blast to the Metal in a Bessemer Converter,"* by J. S. Fulton, *Metals Technology,* vol. 8, No. 6, September, 1941, pp. 1-18. The discussion in this paper is confined to the pneumatic or mechanical phase, as any improvement in that phase will lower the blowing cost, improve bottom life and help to improve the quality of product. The author stresses that when a Bessemer vessel is being blown the blast of air performs two different functions, both of which are necessary for successful steel production. The first function, and the one considered most in this article, is mechanical in that the air is transported by the energy of the blowing engine to the exit of the tuyeres from which it expands at high velocity into the liquid iron, with consequent agitation. The high spots touched upon include the following: that the air circuit should be streamlined and the joints around the vessel be made shipshape; the blast line should be insulated; hot-blast stoves should be installed to raise the blast temperature in the wind box; the humidity of the blast should be maintained at a uniform level through either refrigeration, or injection of moisture to a controlled level, if for no other reason than in order to decrease nitrogen; and each vessel should be calibrated to determine the combination of wind-box pressure, tuyere combination, tuyere size that will give the optimum combination of blowing cost and bottom life. In connection with the operator and his regulating a Bessemer furnace he should be provided with visible indications of the amount of wind entering the riser pipe even on two vessels on a common blast line, and if possible the wind-box pressure as a check on leakage; he also should be provided with all the instruments that can improve the product without making the operation too complex and that he should be provided with a decent place in which to work in comfort; and finally the author suggests that the Bessemer fraternity should get together and really do something about the many pneumatic things unknown about, or wrong with, this process. (F.)

Beryllium

APPLICATION. *"Beryllium,"* by L. L. Stott, *Steel,* vol. 109, No. 17, October 27, 1941, pp. 62, 64, 92-93. Beryllium does possess an unusual combination of properties. As an alloy of copper, it is well established as a commercial product for a growing list of applications. The author discusses the properties of beryllium, how it is used, how it alloys with non-ferrous metals, casting difficulties, applications of beryllium copper, good wear resistance and shock resistance and how it is utilized in aviation industries. (N.F.)

Bronze

AIRCRAFT PARTS. *"Special Bronze Aircraft Parts,"* by J. D. Zaiser, *Steel,* vol. 109, No. 12, September 22, 1941, pp. 66-67. This company is actively engaged in supplying sand and centrifugal castings of special bronzes to 27 aircraft manufacturers. Parts made include propeller blade bushings, cam rollers, center main bearing liners, landing gear parts, orifice retainers and torque link bushings. All parts are made of aluminum bronze, several different analyses being used according to the service requirements. A pictorial presentation gives some idea of the amount of inspection work employed and machining processes required. (Al.)

Castings

See Steel, Castings

Castings

MARINE ENGINE. *"Producing Marine Engine Castings,"* by Pat Dwyer, *The Foundry,* vol. 69, No. 10, October, 1941, pp. 58-60, 127-130. This is the second

and concluding article covering certain phases of foundry practice adopted by the Cooper-Bessemer Corp. plants in the production of triple expansion marine engine cylinders and other castings. In the shop at Mt. Vernon, Ohio, practically all patterns are mounted on strongly built and cleated boards, provided with guide pin holes and in sizes to correspond to a standardized system of flask sizes. The patterns are attached to insets which fit in a recess in the main board. Small metal wearing plates inset in the face of the main frame wear from contact with the flange of the flask. With this arrangement one pattern may be exchanged for another with a minimum amount of time and labor. This is suitable for either flat or split patterns. Patterns for the low pressure and intermediate rings are mounted on a single board, the smaller inside the larger. Metal is poured through a simple yet highly efficient gate system which produces clean, solid castings without the aid of feeders or risers. A single pouring basin on top of the cope delivers metal to two upright sprues about 6-in. apart. Cast iron plugs are employed to keep the sprue openings closed until the basin is filled with molten iron. Runners and gates form part of the pattern equipment. This assures uniformity of castings and removes one of the variables where the gates are cut by hand. Patterns for the smallest ring, that is the ring for the high pressure cylinder is mounted in the same manner as the others. The author discusses the use of the two-part flask and in closing gives data of how high pressure cylinder liners and high pressure valve liners are molded in a horizontal position, dried and cored, then closed and lifted to a vertical position before the molds are filled with metal. (Ca.)

See Bronze, Aircraft Parts
See Magnesium, Castings

Cast Iron

ALLOY ADDITIONS. *"Alloy Additions to Gray Cast Iron,"* by G. A. Timmons and V. A. Crosby, *The Foundry,* vol. 69, No. 10, October, 1941, pp. 64-66, 145-147. Most cast iron parts are used in the as cast condition but many castings are stress-relieved or annealed before they are machined and put into service. Stress relieving and annealing are explained by the authors and relate that foundrymen seldom have the opportunity to evaluate the various commercial alloy additions to gray iron by a direct comparison of these additions alone, all other factors being controlled or held constant. There are sufficient variations in such factors as base composition, superheating temperature, additions of inoculants, types of molds, cooling rates and other factors to make a direct comparison impossible. In this investigation the authors have attempted to hold constant as many of these factors as possible, to determine the efficacy of the more or less common alloy additions to gray iron with respect to the mechanical properties produced in the as cast condition and after subjecting the castings to various annealing treatments. (C.I.)

ALLOY ADDITIONS. *"Alloy Additions to Gray Cast Iron,"* by G. A. Timmons and V. A. Crosby, *The Foundry,* vol. 69, No. 11, November, 1941, pp. 62-63, 144-147. This is the second and concluding section of the authors' paper on effect of alloys on gray cast iron. After discussing that irons containing chromium offer the greatest resistance to hardness breakdown at temperatures in the range 1100 to 1400°F., the authors explain the freezing of cast iron. Comment is made on the effects of the alloy additions upon the rates of transformation. While this investigation determined the effects of the various alloy additions on the properties of a gray cast iron of approximately 3.25 per cent carbon and 2.00 per cent silicon, the same general effects or improvements should be realized in making these additions to other gray cast irons of higher or lower carbon contents, the chief difference being the properties of the base iron to which the additions are made and upon which the effects will be produced. (C.I.)

GRAPHITIZATION. *"The Kinetics of Graphitization in White Cast Iron,"* by H. A. Schwartz, *A.S.M. Preprint No. 27,* 1941, pp. 1-30. Some time ago the author described the curve correlating graphite content with time as being determined by the migratory rate of carbon (in some form) in iron. This interpretation was of considerable utility in the study of graphitization. The present paper is a restudy of the problem to determine the significance of dissociation rate, solution rate, and linear crystallization velocity on the velocity of the process as a whole. It is shown, by purely mathematical reasoning, that near the origin the graphite-time curve is determined by the crystallization velocity of graphite or the rate of solution of cementite. When graphitization is nearly complete it is determined by dissociation. Intermediately the migration rate or the solution rate may become affective. (C.I.)

NICKEL-MOLYBDENUM. *"The Acicular Structure in Nickel-Molybdenum Cast Irons,"* by R. A. Flinn, M. Cohen and J. Chipman, *A.S.M. Preprint No. 2,* 1941, pp. 1-25. Nickel-molybdenum cast irons containing acicular structure undergo a marked increase in strength on tempering at 500 to 700°F. (260 to 370°C.). By means of isothermal transformation studies on thirteen nickel-molybdenum irons, the acicular structures were established as a series of austenitic decomposition products which form below the pearlitic temperature range by the precipitation of free ferrite and the diffusion of carbon into the surrounding austenite. At lower transformation temperatures, the ferrite becomes angular and dark etching due to the entrapment of carbon, and gradually assumes the well-known appearance of lower bainite. The rates of formation of the pearlite and acicular products are presented in the form of S-curves. The proper conditions of alloy content and section size for the attainment of acicular structures directly on casting were investigated, and the results are summarized graphically. The probable cause of this increase in strength on tempering was ascertained by microscopic, X-ray, dilatometric and magnetic measurements. (C.I.)

Chrome

WEAR. *The Chrome-Hardening of Cylinder Bores,"* by H. Van der Horst, *Mechanical Engineering,* vol. 63, No. 7, July, 1941, pp. 536-539, 542. The purpose of chrome-hardening cylinders is to bring about a reduction in the wear of cylinders, piston rings and piston-ring grooves. This paper reviews the ways in which the application of chromium metal on the cylinder bore affects lubrication and choice of fuel. It further deals with the method of application, that is, proper bonding to the base material and the properties of chromium metal as they are good or bad for this purpose. (C.I.)

See Castings, Marine Engine

Cleaning Room

NOISE. *"Reduce Noise in Steel Foundry Cleaning Room,"* by A. H. Allen, *The Foundry,* vol. 69, No. 9, September, 1941, pp. 60-61, 143. The Monroe Steel Castings Co., Monroe, Mich., has rearranged its foundry and erected an entirely new cleaning room which takes advantage of the latest ideas in the technique of foundry noise absorption. The old cleaning room was dismantled and a new building, 133x66 feet, was added to the plant to house the cleaning room. Herein, each workman whose task — chipping and grinding—produces objectionable noise is housed in an acoustically treated booth, castings being delivered to the booths and removed on roller conveyors or monorail. Interior of the building, including walls and roof, is treated completely with acoustic material. Foundations are insulated from the floor and the floor insulated from columns and walls, so that vibrations cannot be transmitted from equipment to the floor and then to the building structure, which would amplify operating noises. All partitions separating the cleaning room from other departments are of acoustical material—rock cork and weatherwood—which has proved beneficial in reducing noises throughout the shop. (Ma.)

Cupola Practice

AIR CONTROL. *"Air Weight Control for Foundry Cupolas,"* by J. R. Howard, *Industrial Heating,* vol. 8, No. 10, October, 1941, pp. 1098, 1100, 1102, 1104. When the iron and coke are charged into the cupola there is no way of controlling the metal in the cupola except by varying the amount of oxygen supplied. Herein is described how an air weight controller is designed to allow only the correct weight of oxygen to be delivered to the cupola. This controller corrects for variations in temperature, barometer, cupola resistance, voltage and blower efficiency. It insures a constant and uniform suppiy of oxygen to the cupola regardless of outside weather conditions. With this controller, the air is measured by means of an orifice plate or venturi tube installed in the blast line. Measurement is in terms of cubic feet per hour at 60°F. and 29.92-in. of mercury, or in pounds per hour. In a positive displacement blower, an automatically controlled butterfly vent valve is placed above the outlet flange on the blower. In a fan type blower, a control valve is placed in the blast line, preferably on the outlet flange of the blower. (F.)

LININGS. *"Practical Application of Monolithic Linings in Cupolas,"* by F. Oldershaw, *The Refractories Journal* (London), vol. 17, No. 8, August, 1941, pp. 275, 277, 279, 281. In recent years monolithic cupola linings have been tried with varying degrees of success, due to the fact that it has been difficult to procure material which can be relied upon to stand up to the varied severe conditions which are encountered in present-day practice. Lots of the failures have been due not so much to the material used as to the application and the initial treatment of the lining before putting the cupola into commission. The author outlines in detail the cupola used in this experiment and facts concerning the actual ramming. The next procedure explained by the

author concerns drying the lining and how it is performed. Operating details are outlined and a novel patching procedure is presented. It has been found that the weakness of monolithic linings occurs at a point between 5 and 7-in. from the face of the lining and is due not to the quality of the material or the application, but to expansion brought about partly by structural conversion or vitrification in the first few inches and to sudden changes in temperature. Damage to cupola linings through careless charging and life of linings also are commented upon. In conclusion the influence of coke size is discussed. (F.)

MELTING. *"Melting Quality Iron in the Cupola,"* by H. S. Austin, *The Foundry,* vol. 69, No. 11, November, 1941, pp. 58-59, 139-143. At the Buick plant there is a battery of six cupolas with 96-in. shells. They are 67 ft. high from the bottom ring to the top of the stack. The author comments on the refractory lining and tuyeres before discussing the tap hole. For a tap hole two cupola blocks of special design, known as "A" and "B" blocks, are used. The "B" block is placed on the inner side of the breast and the "A" block on the outside. Slagging is at the rear of the cupola and for the slag hole a specially designed block of silicon carbide is used. The cupolas have two large charging doors directly opposite each other; one in front where the iron is mechanically charged and the other in the rear where the coke is mechanically charged. The components of the iron charge are picked up with electro-magnets and dropped into a weighing hopper. Material falls into charging buckets which have cone shaped lowering bottoms and do a good job of distributing the metal fairly evenly. Heap sand is used in the cupola bottom. A green compression strength of 3 lb., dry strength of 30 lb., permeability of 50 and moisture of 4 per cent gives satisfactory service. When the sand bed is finished wood is placed over the surface of the sand. A sufficient amount of wood is used to assure that the first of the coke added rests above the tuyeres and that a good start is made for the coke bed. All of the coke used in the bed is weighed. The night men fork in 3000 lb. and the day men come on, and following a gentle air blast of 30-in., fork in another 2000 lb. In cupolas producing cylinder iron 6000 lb. charges are used. Regardless of the melting rate schedule for the day's heat, the blower is started at 850 lb. of air per min., with an air pressure in the wind box of 20 to 22 ounces. The author explains the weight of air supplied to the cupola and their practice of never increasing or decreasing the quantity of air. Daily repairs to the cupola lining are confined to the melting zone, breast and slag hole. Careful control of the chemical and physical properties of the iron is essential. There are six important features which are watched closely in an endeavor to obtain a uniform and satisfactory iron. These are, chemical composition, fracture, chill depth, hardness, fluidity and temperature. Control of these generally takes care of all that is required of the iron. (F.)

Magnesium

ANTIMONY. *"The Effect of Antimony on Magnesium,'* by W. R. D. Jones and L. Powell, *The Journal,* The Institute of Metals (London), vol. 67, 1941, pp. 171-188. Experiments were carried out on the effect of antimony on magnesium. It was shown that antimony does not cause any improvement of the mechanical properties or corrosion-resisting properties. The solid solubility of antimony in magnesium is very small and the alloys are not capable of age-hardening. (Al.)

CASTINGS. *"Stepping Up Production Pace of Magnesium Castings at Ford,"* by H. Chase, *The Iron Age,* vol. 148, No. 14, October 2, 1941, pp. 32-35. Already producing some 137,000 lb. of magnesium castings a month, Ford Motor Co. expects that by the time developments are completed on the design of its new liquid-cooled airplane engine, productive capacity for the light-metal castings will be doubled. The magnesium castings are produced on the second floor of the remodeled iron foundry. Casting is done in sand molds. Sand is prepared on the third and fourth floors and then is conveyed to the second floor where both molding and casting are done. On the first floor are located: core-making and baking facilities, the charging and unloading openings of two vertical heat-treating furnaces in which all castings produced are heat treated, and other equipment not required on the casting floor, such as inspection benches, surface treatment tanks and a completely equipped sand testing laboratory. Superheating and pouring are done in small batches largely to prevent excessive oxidation. Melting is done with about 80 per cent scrap and 20 per cent pigs, the scrap content being large chiefly because so many risers are required to insure sound castings. The alloy is heated to 1250°F. in the melting furnaces to insure fluidity. Batches are placed in superheating furnaces where the temperature is raised to 1600°F. to refine the grain of the alloy and bring the metal above the casting temperature. The metal is allowed to cool before pouring. While standing 0.3 per cent of calcium is stirred in to act as a deoxidizer. While standing and pouring, the metal is dusted with a mixture of half sulphur and half boric acid to prevent it from catching fire and to avoid rapid surface oxidation. The author explains the layout of the casting floor, how pouring is done and reveals that the gating technique was developed with the help of X-ray equipment. The shakeout technique is explained along with the blasting set-up. The castings next move on to a battery of band saws, where gates and risers are cut off for return to the melting furnaces. All magnesium dust from sawing and grinding is immediately sprayed with water and piped to a settling tank, which is cleaned out once a week. Special magnesium fire fighting equipment, employing a sand spray, is kept close at hand. The heat treating is done in a vertical oven in which the temperature is maintained between 715 and 730°F. for 12 hr. Heating is done electrically and controlled thermostatically, the air being circulated continuously while the oven is in use. Although the oven temperature is well below the ignition point of the castings, there is provision for automatically introducing into the oven a sulphur-dioxide atmosphere should a fire occur. Many castings are subjected to a test in water to insure against porosity that may result in leakage. (Al.)

Malleable

IRON. *"Malleable Cast Iron," Canada's Foundry Journal,* vol. 14, No. 9, September, 1941, pp. 22, 24-25. This review of malleable cast iron is taken from a bulletin published by the Ontario Research Foundation. The paper contains general facts concerning the various types of malleable cast iron and other interesting data. Annealed white cast iron, white heart process and the black heart process is explained. Sand practice also is touched upon in this article. (Ma.)

Non-Ferrous

FLASKS. *"Good Flasks Required in Non-Ferrous Foundry,"* by N. K. B. Patch, *The Foundry,* vol. 69, No. 11, November, 1941, pp. 64, 130-132. For small work on a mass production basis light cast iron flasks frequently will serve. In the mass production foundry where interchangeability of castings is one of the prerequisites and a minimum of defectives is a prime requisite, flasks made of steel or aluminum of the right thickness for rigidity, proper design, and accurately machined with accurate pins and removable bushings in the pin holes will pay dividends in insuring accuracy of product and long life of the equipment. Snap flasks are good equipment if they are kept and maintained in a good manner. Where snap flasks are used jackets and bands must be used to support the sand while under the pressure of the molten metal. Jackets and bands must be accurate and strong. Where gray iron flasks are used some form of annealing is beneficial or they should be allowed to stand around or age for some time before being used. All pins and pin eyes should be drilled in jigs that are maintained at a high degree of accuracy. The pins on flasks should be strong enough to resist careless blows that might throw them out of line. Flask pins and flask pin bushings should be oiled carefully with a mixture of lubricating oil and finely ground graphite. (N.F.)

TEST BARS. *"Making Non-Ferrous Test Bars,"* by N. K. B. Patch, *The Foundry,* vol. 69, No. 10, October, 1941, pp. 53, 134-136. Many engineers seem to assume that specifications for cast metals indicate in the physical properties listed the true characteristics for the average casting of the alloy to which the specification refers. This is not correct because the physical properties specified are those outside of which castings are to be rejected. Second, the physical properties listed refer to those derived from the testing of the test bars which in themselves are more standard than any section of any commercial casting. Last, good foundry practice on the part of the foundryman necessarily insures a much better average of physical properties throughout the casting than merely the rejection limits established in standard specifications. The author discusses the work A.S.T.M., the Federal Specifications Board and other associations have done that has resulted in making specifications. QQ-M-151a is the master specification dealing with the general rules applying to the use of Federal specifications and the operation of inspection under these specifications. (N.F.)

Patternmaking

TEMPLATE PIPE. *"Reminiscences of a Foundryman,"* by Tubal Cain, *Iron and Steel* (London), vol. 14, No. 14, September, 1941, pp. 435-437. An informative discussion presented by the author on template pipe. Often the customer takes his own template and sends them together with a sketch of the required pipe to the foundry, but more often the pattern maker is sent out to get the details and make the necessary templates. Much of the designing of template is done by the pattern-

maker and so the pattern is constructed of a design which readily lends itself to molding requirements. A few examples of various designs for pipe are then discussed. These include right angle bend pipe, "Y" pipe, a bend pipe curved in both planes of small diameter and various other types and styles. (Pa.)

Steel

ACID BESSEMER. *"The Acid Bessemer Process of* 1940," by H. W. Graham, *Transactions,* A.I.M.E., vol. 145, 1941, pp. 113-131. In this paper matters of history are dealt with only insofar as they contribute to an understanding of today's situation. Attention is directed to the apparent causes of past developments in seeking to perceive the true direction of trends now in existence and effective as bearing upon future developments. The paper discusses the economies of the Bessemer process, but only to the extent that will bear upon the metallurgist's understanding of his responsibility. The problem of the quality of Bessemer steel is reviewed and examples are given of the technical data upon which the reasoning of the paper is based. Matters of engineering design, mechanical maintenance, operation and metallurgical investigation are surveyed. Comparisons are made between the Bessemer and open-hearth processes for the sake of clear and ready understanding. (S.)

CASTINGS. *"Low Temperature Impact Resistant Steel Castings,"* by N. A. Ziegler and H. W. Northrup, *A.S.M. Preprint No.* 37, 1941, pp. 1-24. An industrial low alloyed steel, to meet the specification of 15 ft.-lb. Charpy at —150°F. (—100°C.), has been worked out. Its approximate chemical composition is 0.05 per cent carbon, max., 0.20 to 0.50 per cent silicon, 0.50 to 0.80 per cent manganese, 0.03 per cent sulphur, max., 0.02 per cent phosphorus, max., and 3.5 to 4.0 per cent nickel. This steel possesses the following minimum physical properties: tensile strength, 60,000 lb. per sq. in.; yield point, 40,000 lb. per sq. in.; elongation, 35 per cent; reduction of area, 60 per cent; and Charpy impact resistance, 40 ft-lb. (at room temperature) and 20 ft.-lb. (at —175°F. (—115°C.) High grade raw materials, careful manufacturing technique and purity of the resultant product are the main requirements necessary for the successful production of this steel. (S.)

December Chapter Meeting Schedule

December 1

Western Michigan
Ferry Hotel, Grand Haven
Representative of Amplex Div., Chrysler Corp.
"Powder Metallurgy"

✦

Metropolitan
Essex House, Newark, N. J.
Equipment Night—*"Molding Machines"*
"Furnaces and Ladles"
"Sand Handling Equipment"
"Casting Cleaning Apparatus"

✦ ✦

December 5

Northern Illinois-Southern Wisconsin
Hotel Faust, Rockford
Christmas Party

✦

Western New York
Hotel Touraine, Buffalo
H. S. FINLEY, Werner G. Smith Co.
"Core Oil"

✦ ✦

December 6

Central Indiana
Hotel Washington, Indianapolis
Motion Picture Films—*"Operation of a Clay Plant"*
"Fire Brick"

✦

Chesapeake
Southern Hotel, Baltimore, Md.
Christmas Party

✦ ✦

December 8

Chicago
Top of the Town Restaurant
Sectional Meetings
Gray Iron, Malleable and Steel
E. G. HOWELL, J. T. McEnroe Co.
"The Scrap Situation"
Non-Ferrous
C. V. NASS, Fairbanks Morse & Co.
"Cores and Test Bars"

December 9

Michiana
Hotel LaSalle, South Bend
E. C. HOENICKE, Foundry Div., Eaton Mfg. Co.
"Permanent Molding Gray Iron"
Motion Picture Film—*"The Manufacture of Refractories"*

✦ ✦

December 11

Northeastern Ohio
Hotel Carter, Cleveland
Christmas Party

✦

St. Louis District
DeSoto Hotel, St. Louis
Christmas Party

✦ ✦

December 12

Central New York
Onondaga Hotel, Syracuse
Christmas Party

✦

Northern California
Lake Merritt Hotel, San Francisco
Speaker from Federal Bureau of Investigation

✦

Philadelphia
Engineers Club
Equipment Night
Motion Picture Film—*"Sand"*

✦

Quad City
Elks Club, Moline
Christmas Party

✦ ✦

December 13

Central Indiana
Hotel Washington, Indianapolis
Christmas Party

✦ ✦

December 17

Philadelphia
Philadelphia Hotel
Christmas Party

December 19

Southern California
Scullys Cafe, Los Angeles
Christmas Party

✦

Wisconsin
Hotel Schroeder, Milwaukee
Christmas Party

✦ ✦

December 27

Cincinnati District
Kenwood Country Club
Christmas Party

✦ ✦

Chapter Organization Meeting

December 5

Toledo, Ohio
Hotel Hillcrest
C. E. WESTOVER, Executive Vice President, A.F.A.
"Application of Production Methods to Some Commercial Jobbing Work"

✦ ✦

Apprentice Meeting

December 12

Birmingham Chapter
Tutwiler Hotel

✦ ✦

Regional Conferences

March 28, 1942

University of Pennsylvania, Philadelphia
Sponsored by Chesapeake, Metropolitan and Philadelphia Chapters

✦ ✦

New England Foundrymen's Association
Sixth New England Foundry Conference
Date to be set

For December Only

CHECK AND DOUBLE CHECK THIS OFFER

It is not likely to be made again. The biggest and best publication offer that the American Foundrymen's Association has presented to date. A $3 value for $2.

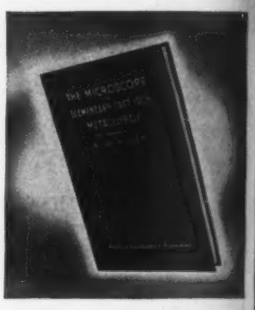
We offer to association members for this month only, the following three publications:

(1) Present Status of Foundry Sand Investigation and Control, by W. G. Reichert;

(2) Production of Uniform Dense Structures in High Test and Alloy Iron Castings, by M. A. Scott; and

(3) The Microscope in Elementary Cast Iron Metallurgy, by R. M. Allen.

These three publications are offered to only A.F.A. members for $2.



The two pamphlets are written by practical foundrymen well known in the industry. The sand paper by Mr. Reichert gives a complete review of foundry sand control by a metallurgist who has established sand control in his plant on a practical and economical basis. Mr. Scott's cast iron paper emphasizes gating and risering problems and relates the experimental work conducted to overcome problems in producing uniform, dense structure castings of high test and alloyed iron, by pouring castings through risers as gates.

The book, commonly referred to in the foundry industry as the Microscope book, speaks for itself. Its popularity was demonstrated when the demand for this book was so great it necessitated a second binding. Those who were at the Cincinnati convention in 1939 remember the author, R. M. Allen, and his interesting lectures, and the favorable comment showered on this publication from apprentices, metallurgists, shop men and executives.

We urge you to take advantage of this opportunity and the benefits that will be derived from these publications. Remember this offer expires December 31.

(Tear out along this line)

American Foundrymen's Association, Inc.
222 West Adams Street, Chicago, Ill.

Gentlemen:

I wish to take advantage of your special December offer of The Microscope in Elementary Cast Iron Metallurgy, Present Status of Foundry Sand Investigation and Control and Production of Uniform Dense Structures in High Test and Alloy Iron Castings at the unusually low price of $2.00 per set. Please find check enclosed for $..... for ..... sets.

Name.....

Company.....

Address.....

City.....